The Magazine of the Registered Professional Engineer

American Engineer

JULY 1960

Can We Solve Air Traffic Problems?

See Page 19

Plus:

Let's Stop Criticizing American Education!

An Industrial Combination—Engineers and Advertising

EUGENE B POWER
EDITORAL DEPT-UNIV MICRO-
313 N 1ST ST FILMS INC
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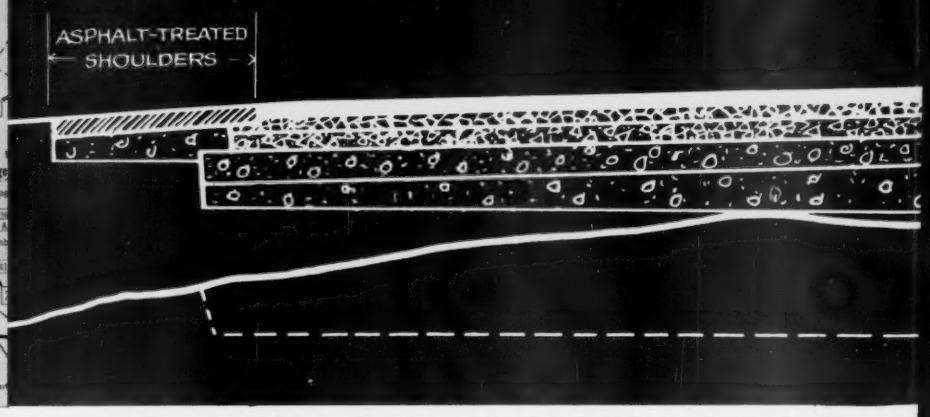
Map shows location of Interstate #81 in Watertown area.



Cross-section diagram shows composition of single 24-foot roadway on four-lane Interstate & Defense Highway #81. Note Asphalt-treated shoulders.

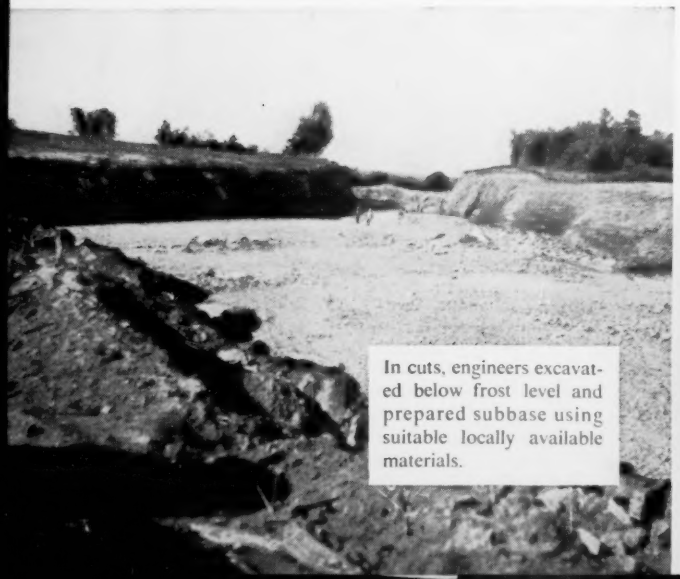
Look what they're doing with DEEP STRENGTH Asphalt Pavement in Upstate New York!

Advanced Asphalt Pavement design, over prepared subbase, solves problems in area where frost depth goes to 48 inches

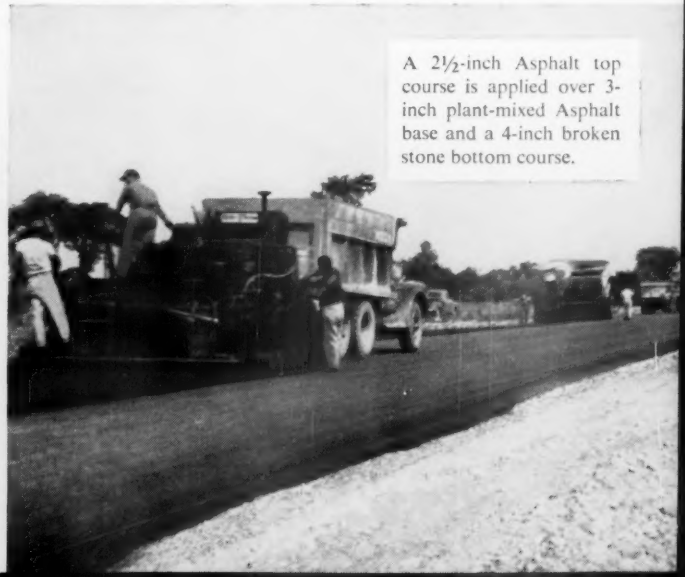
Boulder-strewn glacial till near Watertown presented New York State Highway Department engineers with unusual problems. Here, winter temperatures often reach 20° to 25° *below* zero. The frost depth extends to 48 inches. In cuts, severe frost action sometimes forces boulders *through* the pavement with subsequent break-up and failure.

The cross-section and diagram on this page show how DEEP STRENGTH Asphalt pavement design solved the problems. Notice how the precepts of new DEEP STRENGTH Asphalt design are carried out. They include Asphalt base, Asphalt-treated shoulders, depressed median for good drainage and flat slope embankments for better safety. Capillary moisture action and frost damage are prevented by building the road structure with selected materials.

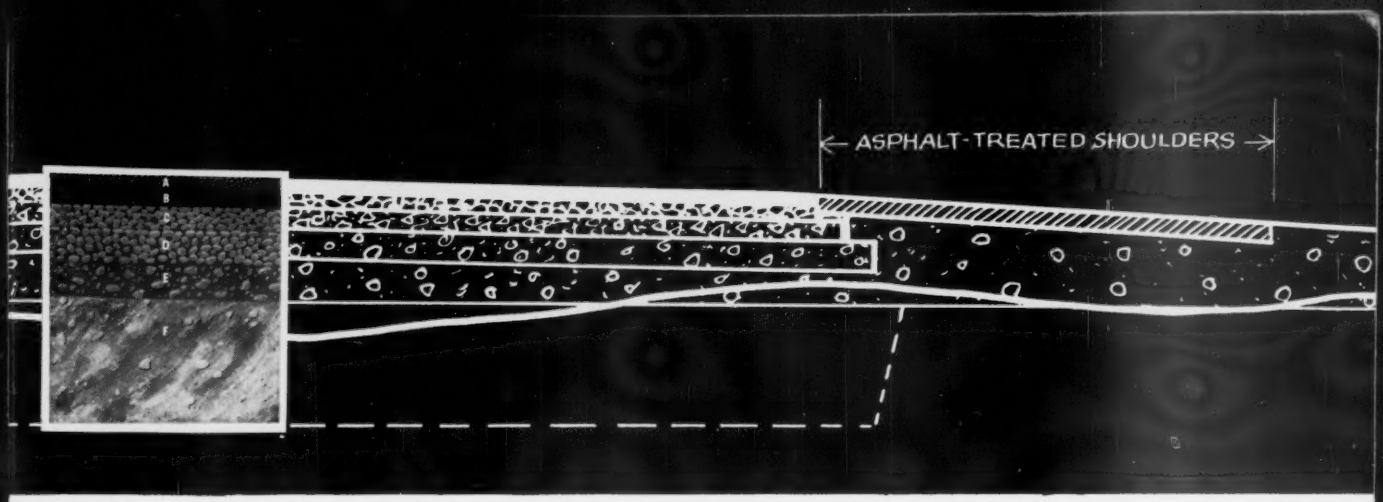
When designed like this—for DEEP STRENGTH—Asphalt pavements will carry the heaviest traffic loads without distress . . . with minimum maintenance cost. For example, the DEEP STRENGTH Asphalt-paved New Jersey Turnpike carried over 46 *million* vehicles during 1959.



In cuts, engineers excavated below frost level and prepared subbase using suitable locally available materials.

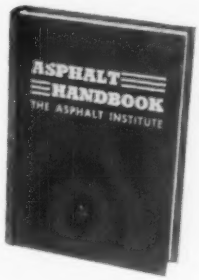


A 2½-inch Asphalt top course is applied over 3-inch plant-mixed Asphalt base and a 4-inch broken stone bottom course.



SAVE MONEY, TOO! Modern low-maintenance DEEP STRENGTH Asphalt pavements often cost *less* to build than Asphalt pavements designed to other standards. That's because the Advanced Design Criteria often permit Asphalt base to be substituted for some of the more expensive Asphalt concrete surfacing, and allow reduction in total structure thickness when used in place of untreated base.

NEW HANDBOOK . . . a new edition of the *Asphalt Handbook* incorporating all the Advanced Design Criteria implied by the term DEEP STRENGTH Asphalt Construction soon will be available at the Asphalt Institute office serving your area.



THE ASPHALT INSTITUTE
Asphalt Institute Building
College Park, Maryland

THIS IS DEEP STRENGTH

A
2½-inch Asphalt concrete surface course

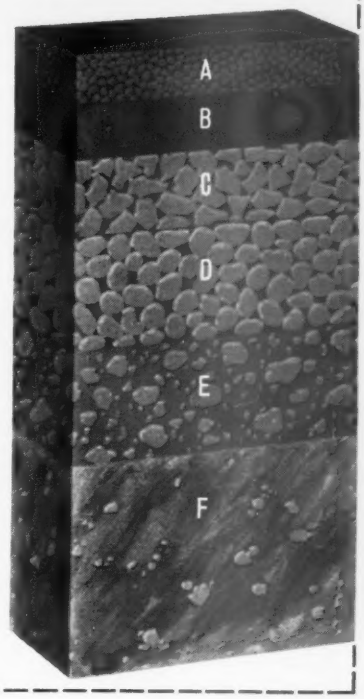
B
3-inch Asphalt base course

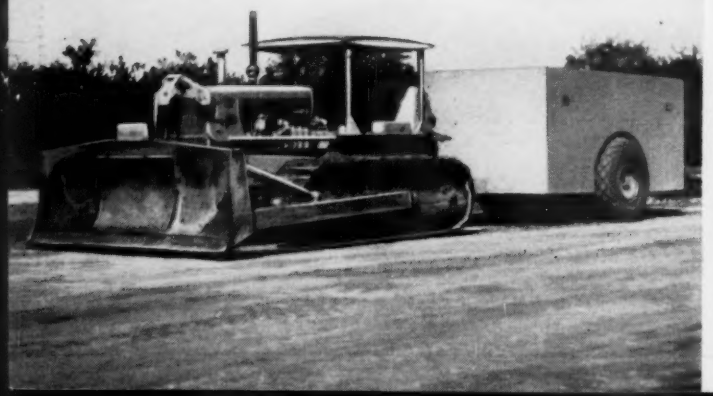
C
4-inch base course of broken stone

D
6-inch graded gravel subbase

E
6-inch bank-run gravel foundation course

F
Excavated to 48 inches below pavement grade in cuts—locally available backfill material compacted with "super" compactor.





50-ton rubber tire "super" compactor used on all supporting courses to assure smoother riding under all traffic weights to come.

Asphalt-treated shoulders provide good surface drainage; white calcite chips insure better traffic-lane demarcation. Depressed median permits proper subsurface drainage.

Letters to the Editor

'Direct Answer' . . .

Dear Editor:

Since you have raised the question "Is equality of military service more important than advanced training in a discipline deemed vital to the nation," (See From Washington, May, 1960, AE) I feel that the question deserves a direct answer.

Equality under the law *is always* more *important* than any discipline that may be construed to be vital to the nation.

There has been too much hiding under the cloak of scholarship deferments and we as engineers have no right to interfere with the Selective Service process. I will be the first one to admit that the Selective Service process is a complete phoney no matter how it is interpreted but there should be no deferments under any circumstances until it has been definitely proved beyond a shadow of a doubt that a man is not able to meet the requirements of simple basic training. If a prospective candidate for engineering can meet the discipline of the courses for a degree then he is certainly qualified for military service first and education comes next. If the candidate is really interested he has the opportunity to develop both disciplines at the same time.

STEWART S. FRITTS, P.E.
Richmond, Va.

BER Case . . .

Dear Editor:

The report by the Board of Ethical Review (AE, May) was interesting and well presented but the Board, it seems to me, decided on a trivial question.

I would be curious to know how the Board would decide, on the same set of facts, the question, "Was it ethical conduct on 'A's' part to attempt to force a former client to rehire him by denying the client access to other qualified professional help." Further, "Is it ethical for any engineer to refuse such a job for the sole purpose of keeping another engineer employed by an obviously dissatisfied client."

Section 2 of the Canons of Ethics states in part ". . . he will avoid all conduct or practice likely to discredit or do injury to the dignity and honor of his profession." (The significance of this section is further reaching than its published interpretations imply. Interpretive rules 5, and 6 dwell on telephone listings and totally ignore what appears to me to be the most important portion of this section.) Instigating a boycott as a means of coercion (it appears that this is Engineer "A's" purpose) strikes me as being undignified, dishonorable, perhaps illegal and likely to injure the status of the professional engineer.

Nowhere do the facts indicate that Engineer "A" was seeking redress through the courts with regard to a contract violation. Under these circumstances since no question of fee settlement is raised, refusal to accept dismissal by a client is unprofessional and indeed, childish. The right of a client to engage, dismiss and change professional advisers *for any reason whatever* is well established in the fields of law and medicine. We should expect our profession to be treated no differently. Having failed in an attempt to persuade the client to retain his services "A" should have retired gracefully, in a dignified manner, collected his due fees and turned his work to date over to the client for possible use by his successors. This is professional conduct.

I therefore believe that "A's" ethical conduct is more open to question than "B's" and am somewhat disappointed that the Board did not bring out this possibility in their discussion of the case.

THEODORE H. YAFFE, P.E.
Baltimore, Md.

Languages . . .

Dear Editor:

The article, "Exchanging Knowledge Through Interlingua" in the April issue of AE, by stressing the need for a neutral interlanguage, has brought before the engineering profession a problem of increasing importance. However, in accordance with engineering principles, all the facts should be considered before a solution is accepted.

We should note that there is an international language called Esperanto which antedates Interlingua. It has been learned by several million people and the number of its participants is constantly increasing. It also has an expanding literature comprising about 10,000 volumes covering diverse fields of knowledge including science, and among its 100 periodicals there are journals on science, geography and medicine.

Interlingua was constructed by extracting the common elements of both vocabulary and grammar from the European languages, but the result was a language related directly only to the romance group because it is only among these that "commonness" exists. This limits the easy readability to those who have studied romance languages. Furthermore, it is difficult to write and it has not been demonstrated in the six years since it was first presented that it can be spoken. This expressibility difficulty arises from the fact that it has a grammar in the national-language form, even though it has been somewhat ironed out, and everyone who has studied a foreign language is aware of the complications involved.

Because Esperanto has been planned for greatest effectiveness it has been called unnatural by Interlingua promotion literature. Each new form of travel and each new form of communication has seemed unnatural until people became accustomed to it but it is obvious that we prefer progress. I believe that Esperanto, the engineered language for all types of world communication, will appeal to engineers and I invite you to send to the Esperanto League of North America, 808 Stewart St., Meadville, Pa., for more information.

DONALD MUNRO, P.E.
Quakertown, Pa.

Questions Speed . . .

Dear Editor:

The article in the June, 1960, issue of AMERICAN ENGINEER on the cross channel link between England and France provided fascinating reading.

One aspect, however, has me confused. Early in the article I read that, "Under the plans for the tunnel, passengers would be able to make the trip in about four hours and twenty minutes in comfortable modern trains." Later, though, the writer indicates that travelers in their automobiles ". . . will be whipped through the 32-mile long tunnel at fifty-five to sixty miles an hour. . . ."

DAVID A. H. ROETHEL, P.E.
Silver Spring, Md.

► Editor's Note: As indicated in the preceding sentence of the article, the four hour and twenty minute time refers to the total length of the trip from Paris to London. The channel crossing, by itself, of course, will take only about thirty-five minutes via the proposed tunnel.

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Withstood 3389 hr. Gov't. salt spray test—23 years field exposure. Eliminates bolts and rivets, specify for pipe joints. Galv., structures, tanks, ducts, cold storage and packing plants, drains, washers, towers, steel bldgs., repairing skips. GALV-WELD PRODUCTS, Dept. AE-3, P. O. Box 1303, Bradenton, Florida.

(Circle 1 in Readers' Service Dept.)

American Engineer

JULY 1960
Vol. 30, No. 7

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President, NSPE

'Challenge of the Sixties' Discussed By New NSPE Head

THE "Challenge of the Sixties," which has been the theme of much of our Society's activities this year, is no idle statement. Indeed, the sixties are a challenge not only to us and our Society, but indeed a challenge to our country and to every one of its citizens. These years will determine whether these United States are going to maintain the leadership in world affairs that we have attained and should retain, or whether we will sink to the level of a second-class nation.

The exploding developments in political affairs at home and abroad, in population growth, and in both military and civilian technology will have a terrific impact upon us as individuals, and upon our National Society of Professional Engineers. We must be prepared to take our part in the historical events of these eventful years.

We have recently welcomed into our Society the state societies of Kentucky and New Hampshire. We now have affiliated societies in all the fifty states, the District of Columbia, Puerto Rico, and the Canal Zone. Thus the dream of Dr. Steinman and the other founding fathers of twenty-six years ago is partially realized. This has been the goal of all of us, as well, for many years, and I am particularly gratified that my administration will operate with all the states represented in our Society.

Our membership on April 30, was 46,787 professional engineer members and 6,077 engineer-in-training members, for a total of almost fifty-three thousand. With this membership we have by far the largest number of qualified engineer members of any engineering society in the United States. This membership represents an impressive growth from the approximately two-thousand members in the four original state societies. We can be proud of that growth, but we cannot rest on our laurels and become complacent. When we realize that there are some 250,000 registered engineers in the United States and many thousand more qualified but unregistered engineers, we can see that we still have some distance to travel. There can be no slackening of our efforts.

To attract and hold these registered and unregistered engineers in our Society, NSPE must have a living, dynamic program.

Our state registration laws must be protected, enforced, and strengthened. As you know this is a continual struggle. It is our license as professional engineers that we are protecting. If we do not do this no one is going to do it for us.

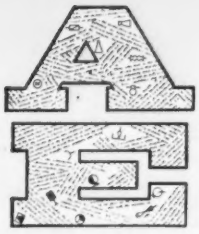
We must work together with the other engineering societies for the better organization of the profession for more effective action.

We must develop ethical standards of practice for our profession, see that these standards are widely recognized and followed.

As citizens, engineers, and as members of the National Society of Professional Engineers, every one of us and every other engineer in these United States will need all of the skill, exeprience, dedication, and courage to meet the professional and civic challenges that face us now and will face us in the future. There will be no room for the fainthearted, the poorly prepared, or the mediocre practitioner. Only the best will suffice. We are going to need the very best utilization of our engineering and scientific manpower and resources to meet the test.

We must take our place at the local, state, and national level as the leaders our professional training qualifies us to be, not only in purely technical matters, but in the many public affairs where leadership is so sorely needed.

In the activities of our National Society over the years, the Society has been blessed with a dedicated group of members who have been active in its affairs. Every year thousands of engineers have given freely of their time and their talent to further its objectives. These include the officers, the directors, and the committee members in the chapters, the state societies and at the national level. In our Washington headquarters we have a dedicated staff that is unmatched anywhere. The combined efforts of all these have made the National Society what it is today, the outstanding and effective spokesman for the professional engineer and the engineering profession.—**End.**



"This Month"

The increase alone in the number of aircraft has given engineers enough traffic headaches, but now come the jets to compound the worries. An AE staff report beginning on page 19 goes into all the facts and figures on what is happening and what engineers propose to do about it.

We have published many articles (possibly too many!) on failures in American education. How about the other side, we thought, so here it is in "Let's Stop Criticizing American Education!" (page 27) and it is by an expert on the subject.

Too many people do not realize that a large share of the advertising in the U. S. is industrial in nature without even so much as a whisper about stomach acid or tired blood. The advertising agency men and company engineers who quietly work together in this interesting arena are one of industry's most important teams. "An Industrial Combination—Engineers and Advertising"—page 31—records a visit at the sprawling offices of the G. M. Basford Company, the nation's largest industrial agency where engineers pretty much run the show.

And, speaking of advertising, this is the subject of the latest Board of Ethical Review report, page 34. Page 35 brings us "What is the Real Meaning of Engineers' Registration?" for "This Month's" professional piece.

Every AE reader should give top priority to the full report of the recent NSPE meeting in Boston, pages 40-49. This is your Society and your profession—keep tabs on what is happening.

Backing up to the front of the book, the AE joins in hailing our new president, Noah E. Hull, P.E., from Houston, Texas. See page 6.

In the news:

General. Page 8. The stories deal with a proposed $34-million highway research program; a utilization conference in Alabama; the election of J. Graham Dale as head of the Canadian P.E. Council, and a talk given by the Defense Department's Dr. Herbert York at Case Institute.

Consulting. The headlines (page 10): Highway Program Cutbacks Shelved—Secretary Mueller . . . Bill Introduced to Raise Commerce Dept. Per Diem . . . Maine Engineer Violates State Architectural Act.

Education. In the main story here, Eugene McDermott of Texas Instruments, is reported as having told Stevens Institute students that they should worry more about learning basics and less about specialization. Other news shows combined journalism-engineering courses at California State Polytechnic College; announcement of Tau Beta Pi fellowship winners; more engineers entering grad school, and Dr. Eric Walker head of ASEE. Page 12.

Government. Page 14. The big story here "This Month" is NSPE's urging of the House Armed Services Subcommittee to amend a bill that would increase the use of formal advertising and competitive bidding. The Society favors negotiation procedures.

Industry. Page 15. More headlines: Sperry Engineers Group Vote for Affiliation with Union . . . Seasonal Decrease Shown in Demand for Engineers . . . NLRB Has Split Decision on Status of Draftsman . . . Ineffective Communications Affecting Nation's Advance, Says Bell Executive.

Kenneth E. Trombley

Editor

Huge $34 Million Research Program for Highways Urged

An expanded national program of highway research, extending over the next four or five years at an estimated cost of $34 million, has been recommended in a special report to the Highway Research Board, a unit of the National Academy of Sciences-National Research Council.

The report said that "a wider and deeper knowledge in every field of highway transportation is indispensable," and defined nineteen broad areas of research, each of which "is adjudged to rate A-1 in importance and urgency."

Recommended research costs range from $50,000 for studies of "Standards for Secondary and Rural Roads" up to $10 million for "Improvement of Knowledge of Aggregates and Soils," which the report said is "most urgent because of the accelerating demand for roadbuilding materials and the diminishing supply of aggregates."

The report, based on a two-year study by a five-man technical committee, suggested in connection with the research on soils that "possibly nuclear energy may transform clays and other now undesirable materials into useful aggregates."

Among other high-priority investigations urged by the committee were projects in traffic safety, road maintenance, and the use of electronic devices in simulating traffic flow, controlling vehicles on the road and simulating driver reactions behind the wheel.

Chairman of the group is E. H. Holmes, assistant commissioner for research of the U. S. Bureau of Public Roads. Other members are Harmer E. Davis, director, Institute of Transportation and Traffic Engineering, University of California; W. A. Bugge, director of highways, State of Washington; F. V. Reagel, engineer of materials and tests, Missouri Highway Department, and Otto H. Fritzsche, State highway engineer of New Jersey. Mr. Fritzsche was appointed last February to replace Charles M. Noble, formerly director of highways in Ohio.

The committee's report said that expanded research in this field has become critically urgent because highway transportation in the United States "has become more than a factor in the economy; it has become a part of the American way of life. The economic structure is utterly dependent on it."

General Minton Elected Pres. Military Engineers

Major General A. M. Minton, the Air Force's director of civil engineering, was elected president of the Society of American Military Engineers at their recent meeting in Washington, D. C.

The Society, with a membership of nearly 30,000, is composed of engineers of all services, and is dedicated to the national defense. Posts are located world-wide, with student posts at leading colleges and universities throughout the United States.

General Minton is a registered professional engineer in the District of Columbia. In addition to membership in the Society of American Military Engineers, he is a member of the American Society of Mechanical Engineers and the National Society of Professional Engineers.

Alabama Utilization Conference

These three men participated prominently in the recent Utilization of Scientists and Engineers Conference held at the University of Alabama. They are, l.-r.: Norman Michels, vice president-engineering, TCI, U.S. Steel Corporation, Birmingham; Paul H. Robbins, NSPE executive director, and Leonard Woody, president of the Alabama Society of Professional Engineers, a sponsor of the conference.

J. Graham Dale to Head Canadian P. E. Council

J. Graham Dale was elected president of the Canadian Council of Professional Engineers at the group's annual meeting recently in Saint John, New Brunswick. He is manager of customer service and utilization for Northwestern Utilities, Limited, Edmonton, Alberta.

J. Graham Dale

Other new officers are W. L. Wardrop, vice president, consulting engineer, Winnipeg, Manitoba, and D. S. Simmons, member of the executive group, general manager, manufacturing, Imperial Oil Limited, Toronto, Ontario.

P.E. Examination Book Released; LaLonde Author

Professional Engineer's Examination Questions and Answers by William S. LaLonde, Jr., P.E., is the title of a book just released by the McGraw-Hill Book Company.

Planned to keep pace with the rapidly developing new engineering ideas and procedures represented in recent professional engineer's license examinations, this question-and-answer guide has just been published in a revised and enlarged second edition.

The questions and answers showing the type of question asked and the kind of answer that examiners accept have been increased by twenty per cent over the previous edition, with material authenticated by a man who has acted as a consultant both to examining boards and to individuals preparing for examination.

Over 600 questions selected from recent actual examinations for the professional engineer license, the land surveyor license, and the engineer-in-training certificate are included in this second edition.

The questions cover all major areas of professional engineering examinations. There are questions in fundamental engineering, in chemical, civil, electrical and mechanical engineering. Many are composites of the more complex questions found in professional engineering examinations all over the United States, making the book adaptable for any part of the country where the examination may be taken.

Further information on LaLond's *Professional Engineer's Examination Questions and Answers*, second edition, can be obtained from the McGraw-Hill Book Information Service, 327 W. 41st Street, New York 36, N. Y.

E. B. Robertson Awarded Honorary AIEE Membership

A certificate of honorary membership in the American Institute of Electrical Engineers has been presented to Elgin B. Robertson, of Dallas, Tex., a former president of the Institute. The presentation was made by J. H. Foote, AIEE president during the annual meeting of the 76-year-old organization in Atlantic City, N. J.

Mr. Robertson, who is president of Elgin B. Robertson, Inc. and of Plastics Manufacturing Co., is the 46th recipient of the certificate.

Mr. Robertson was a director of the Institute from 1947 until 1953 and was its 1953-54 president. He has been a director and president of the Texas Society of Professional Engineers, and also has been an NSPE national director.

York Talks on Research to Case Grads

For every dollar that the United States spends in purchasing existing types of military weapons and equipment, forty cents is spent developing and testing new types to replace those already in hand, Dr. Herbert York, director of research and engineering for the U. S. Department of Defense, said in the 84th Commencement address at Case Institute of Technology.

"This demonstrates," Dr. York declared, "the very great importance of the role of science and engineering in the defense of the nation. In order to deter war and in order to win and survive, should deterrence fail, our armed forces need the very best that modern technology can provide.

"Never before in history has the advance of knowledge been as rapid as the present. This is so because new knowledge is no longer being extended by a few isolated scholars but by literally hundreds of thousands of persons on university campuses and industrial and medical laboratories and in other kinds of research institutions. There are more people than ever before who are capable of advancing the frontiers of science and technology and there are more means for putting discoveries and inventions to work after they are made.

"As a statistical measure of the increasing involvment of the Federal Government in science and engineering, we may note that between 1940 and 1960 Federal support of research and development rose from about one hundred million dollars to about eight billion dollars annually, almost one hundred fold."

Dr. York urged the 309 graduating seniors to "educate yourselves concerning the major issues of the day, particularly those involving the interplay between science and engineering and domestic and international affairs.

"It is especially important for scientists and engineers to do this since the great majority of our population and governmental officials are generally uneducated in technical matters. Then after informing yourselves you should act and speak in the ways open to citizens.

"At the very least you can exercise your right to vote, to argue with your neighbors and write letters to the editor. The rapid development of technology and the strong impact this development is having on world affairs makes it mandatory that many more scientists and engineers accept the role of interpreter," he added.

Highway Program Cutbacks Shelved—Secretary Mueller

There will be no cutbacks in the urban portions of the Federal-aid highway program states Secretary of Commerce Frederick H. Mueller. In a letter to Representative Gordon Scherer of Cincinnati, the Secretary made assurances that the Administration's Bragdon study recommending reductions has been definitely shelved, and that "the administration has no intention whatever of abandoning any of the routes presently designated as general corridors of traffic—in urban or in rural areas."

Maj. Gen. John S. Bragdon is a special assistant to the President for public works planning who had recommended in a special report that expensive urban portions of the interstate highway system be eliminated, and that other standards be lowered to get the mammoth program out of the red.

The dropping of the Bragdon plan represents a final victory in Rep. Scherer's six-month running battle against deemphasis of the important program. Arguing that Congress was responsible for the financial embarassment of the program because of anti-recession spending in 1958 and because of its failure to increase gasoline taxes, Rep. Scherer has vigorously opposed any cuts which would lower standards or reduce the scope of the program.

Climaxing his fight, Rep. Scherer wrote to Secretary Mueller on April 12 expressing his concern over the proposed cutbacks, and requesting that the Administration declare its intentions one way or the other on the program. In his answer, Mr. Mueller said that there would be no cutbacks, and that the program would proceed as originally planned.

Bill Introduced to Raise Commerce Dept. Per Diem

A bill recently introduced by Senator John McClellan of Arkansas would allow the Secretary of Commerce to procure the services of experts and consultants at a per diem rate of $100. The previous per diem maximum had been $50.

The $100 maximum, long advocated by NSPE in its efforts to obtain reasonable compensation for consultants performing professional services for the Government, was introduced as an amendment to the Department of Commerce appropriations act at the specific request of Secretary of Commerce Mueller. In a recent letter to Congress, Secretary Mueller drew attention to the fact that the old rate was hampering the operations of the Department.

"In years past," wrote the Secretary, "a maximum limitation of $50 per diem . . . has generally sufficed to enable the Department to procure the services of persons who meet Civil Service Commission criteria for experts. In recent years, however, increasing difficulty has been experienced in obtaining the services of individuals who are truly qualified as experts because of the fact that such individuals in private employment now receive compensation at rates substantially in excess of the $50 per diem rate available for serving the Government. . . ."

The self-employed retirement bill (H.R. 10) has passed a major hurdle—approval by the Senate Finance Committee. The favorable vote was 12 to 5 on an amended bill as basically proposed by the Treasury Department.

As approved by the Finance group, self-employed consultants could defer taxes on ten per cent of earned income each year for retirement purposes, limited to $2,500 a year, provided a nondiscriminatory pension benefit was also provided employees, if any, as is now required of corporations.

Maine Engineer Violates State Architectural Act

The fact that a registered engineer has the right under the Maine architectural registration statute to practice architecture incidental to his work as an engineer, does not permit him to advertise himself as an "architect," a Maine judge ruled recently.

A jury then found the engineer guilty of violating the State architectural registration act. The engineer has appealed the decision, claiming that he was exempt from the architectural registration act and that his use of the title "architect" was merely incidental to his practice of engineering.

The facts showed that the engineer had erected and maintained a sign reading, "Melvin W. Beck, Engineer and Architect," which, as an engineer, he claimed he had a right to do. The lower court judge, however, disagreed, and told the jury that the use of the title "architect" by an engineer does not come within the exemption under the architectural registration act "unless at the same time it is being used in the actual practice of engineering." The jury found that the engineer by means of the sign did, in fact, use the title "architect" in a manner which was not incidental to his practice of engineering. *(State of Maine v. Beck, Superior Court, Kennebec County.)*

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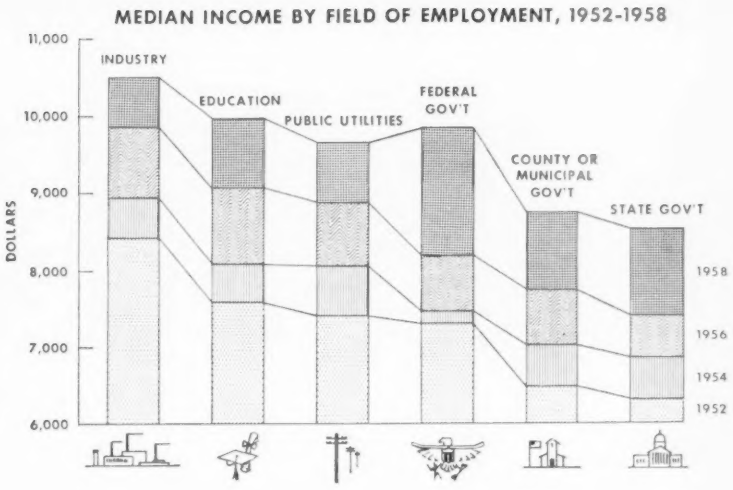

Here is the latest in a continuing series of income and salary surveys of the engineering profession made by the National Society of Professional Engineers. Started in 1952, the surveys are part of a long-range income and salary study program. The fourth biennial survey gives a detailed picture of engineer earnings by year of entry into the profession, by geographical region, by type of employer, by engineering specialty—and by a variety of other categories. Salary and income data from approximately 19,000 registered, professional engineers were studied for this newest survey report. Published in handy booklet form, the 1958 Survey provides a documented study at all levels of professional experience. One of the features of the report is a detailed analysis of salary trends recorded in the four surveys to date.

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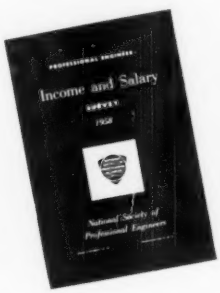

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Specialize Less, Teach More Basics, Says Industrialist

Engineering colleges should specialize less and concentrate on principles basic to all engineering fields if their graduates are to keep pace with the rapid growth of scientific knowledge, Eugene McDermott, chairman of the Executive Committee of Texas Instruments Incorporated, said recently.

Speaking at the eighty-eighth annual Commencement exercises of Stevens Institute of Technology, Mr. McDermott said, specialization should rather be undertaken in graduate school and the "art' of engineering learned on the job. Only in this way can scientists and engineers, who in the past have been separated "physically and mentally according to their fields, join together for unified thought and effort."

The engineer must become "a bedfellow with the scientist. The scientist builds new knowledge; the engineer builds a chain of new products using that knowledge."

"We must make sure that our educational institutions don't take our students down a narrow, specialized path," the speaker warned.

Discussing the difficulty of covering present-day science and engineering knowledge in only four undergraduate years, Mr. McDermott pointed out that legal and medical education takes much longer than engineering. Yet, he said, "Scientific knowledge is doubling roughly every fifteen years."

He suggested that "the best answer may be an extension of the educational period along with reorientation of the curricula."

"The practicing engineer, too, must continue to acquire this new knowledge which so steadily and relentlessly is accumulating if he is to keep abreast of the requirements of his profession. In a very vital respect, the future of our nation depends upon the quality of our engineering competence," he concluded.

Journalism-Engineering Combined in New Courses

College journalism training is combined with business and engineering courses in a new program just announced by the Department of Technical Journalism at California State Polytechnic College's home campus, San Luis Obispo.

Starting this fall, students in the new Business & Industrial Journalism specialty will take about one-fourth of their courses in engineering and/or business, about one-fourth in journalism, and the remaining one-half in "general education" with emphasis on English, economics, social and political science, and similar fields. The result, department head Ken Kitch points out, will be a graduate designed to be grounded in editorial, advertising and public relations fundamentals who at the same time can speak the language of business and engineering, knows what is significant material in those fields, and knows where to find it.

Meetings of Note

Engineering Curricula Conference—Special meeting for deans and department heads of colleges with curricula in civil engineering. July 6-8. University of Michigan, Ann Arbor, Michigan.

Research and Development Management Seminar—Special engineering session, July 24-29, Pennsylvania State University, University Park, Pennsylvania.

Tau Beta Pi Selects Six for Fellowships

Six young engineers have been selected by Tau Beta Pi, national engineering honor society, for graduate fellowships.

The six men are Richard L. Francis, Bluefield, W. Va.; Alan J. DeVilbiss, Roanoke, La.; Timothy R. Schlax, Salem, Wis.; Bob L. Gregory, Phoenix, Ariz.; Bruce G. Nimmo, St. Petersburg, Fla., and William C. Rochelle, Angleton, Tex.

These awards by Tau Beta Pi's Fellowship Board bring the total to 158 fellowships granted since the program was inaugurated in 1929. Stipends for the group are $1,800 for the nine-month academic year.

Serving on the Fellowship Board are Paul H. Robbins, director of fellowships and NSPE executive director; Ralph S. Healy, retired engineer, formerly with the New York Telephone Company, New York City; Joseph C. Wagner, supervisor of industrial relations, The Texas Company, Beacon, N.Y., and Emanuel A. Salma, assistant dean in charge of the engineering evening division, New York University, New York City.

Tau Beta Pi observed the 75th anniversary of its founding at Lehigh University in June.

McMorran Given Alumni Honor by Syracuse Univ.

J. Burch McMorran, superintendent of public works of New York State, has received the highest alumni honor given by his alma mater, Syracuse University.

The George Arents Pioneer Medal for "excellence in civil engineering" was presented to McMorran, class of 1922, by Chancellor William P. Tolley at the university's annual Kum Bak Show, a special alumni event of Commencement weekend.

Alexander Haring Honored At New York University

The gift of a memorial tablet honoring the late Alexander Haring, professor of bridge and railway engineering at New York University, has been announced by Dean John R. Ragazzini of NYU's College of Engineering. The bronze tablet was presented to the University by the Bronx Chapter of the New York State Society of Professional Engineers.

William C. Kane, president of the Chapter, made the presentation during the annual Alumni Homecoming Day on the University Heights (Bronx) campus.

Professor Haring, a graduate of Rensselaer Polytechnic Institute and of the New York University School of Law, taught at NYU from 1905 to 1936. He was consulting engineer for the New York World's Fair from 1937 to 1939 and was secretary of the New York City Department of Public Works from 1940 until his death in March of this year.

Professor Haring served the Bronx Chapter as director and as president.

"Naturally I filed them away according to the size of the paper."

Alaskans Break Ground

University of Alaska engineering faculty and graduates are shown as ground was broken for the first phase—cost $708,000—of the engineering laboratory building on the state university campus at College, Alaska. Wielding the shovel is Charles Sargent, acting dean of faculty. Also in the photograph are, l.-r.: H. Woodrow Johansen, district engineer for the U. S. Bureau of Public Roads; John Mehler, university librarian; Ben Atkinson, university engineer; Robert Hanson, engineer with Burgess Construction Co., contractor on the job; George Knight, assistant professor of civil engineering; Dr. Robert R. Wiegman, vice president of the university; Dr. E. F. Rice, acting head, Department of Civil Engineering; Dean Sargent; Dr. Ernest N. Patty, president of the university; Douglas Huber, instructor in mining and president of the Alaska Section, AIME, and Donald MacDonald III, class of 1932 and son of pioneer Alaskan engineer.

More Engineers Entering Grad School

Fewer engineers will be coming out of colleges in the next few years, but more of the ones who do will have some graduate work behind them.

A report by the American Society for Engineering Education states that engineering enrollments have dropped over the past two years from 78,757 in the fall of 1957 to 68,000 in the fall of 1959, even though total freshman enrollments have increased. To further pinch the short-term supply of engineering graduates, ASEE says that more engineers are entering graduate school, thus delaying their entry into the job market. In addition, dropouts among engineering students have increased.

Reasons for the decline in enrollments compiled from statements of 150 engineering deans by the Engineering Manpower Commission reflect the following factors:

- The current glamor attached to the science fields is attracting many of the qualified students who would otherwise enter engineering.
- Students appear to be more concerned over the rigors and demands of engineering education.
- Decrease in application to studies by students lacking in genuine interest and motivation for engineering.

Many deans were critical of the high school preparation received by engineering applicants, while others felt that an increased lack of maturity hurt the ability of many students to absorb curricula.

Dr. Eric A. Walker is New President of ASEE

Dr. Eric A. Walker, president of the Pennsylvania State University, is the new president of the American Society for Engineering Education.

Dean Melvin R. Lohmann of Oklahoma State University and Professor Newman A. Hall of Yale University have been chosen as vice presidents, and Wendel W. Burton of the Minnesota Mining and Manufacturing Company has been renamed treasurer.

House Group Urged to Amend Bill on Competitive Bidding

In an effort to assure the continuation of negotiation procedures for the procurement of professional engineering services by military agencies, NSPE has urged a House Armed Services Subcommittee to amend certain features of a pending bill designed to increase the use of formal advertising and competitive bidding. The procurement of professional services is presently exempted from formal advertising requirements of the Armed Services Procurement Act, but proposed changes to existing law, NSPE pointed out, could detract from qualification as the primary consideration in the awarding of a contract for such services.

The bill, sponsored by Armed Services Committee Chairman Carl Vinson, would require that in all negotiated contracts in excess of $2,500, proposals are to be solicited from the maximum number of qualified sources, and written or oral discussions be conducted with offerers "who submit proposals within a competitive range, price, and other factors considered."

NSPE viewed this language as permitting some element of competition based on price to be taken into consideration during contracting procedures for professional services. "If such be the case," the NSPE statement continued, "conditions would then exist by which Federal law would sanction a practice which is contrary to existing procedures and contrary to professional ethics which prohibit professional consulting engineers from bidding competitively for contracts involving the rendition of a professional service. The Government would thus deprive itself of the services of qualified engineers who subscribe to and practice under these ethical standards."

NSPE also expressed concern with a section of the Vinson bill which would amend existing law to require that when certain types of contracts are negotiated, including those for professional services, such contracts "shall be supported by a written finding setting out facts and circumstances sufficient to clearly and convincingly establish that use of formal advertising would not have been feasible and practicable." The Society told the Subcommittee that there is no need for such a requirement insofar as professional services are concerned, because under existing law, "if the services are professional, the contract is to be negotiated, and if the services are not professional, the present exception does not apply. . . . Consequently, the only justification needed to establish that the use of formal advertising would not have been feasible and practicable, is a showing that the services are professional in nature and thus clearly within the present exception."

The statement also informed the Subcommittee of the Society's detailed professional policies pertaining to competitive bidding for engineering services, and the recommended procedures for negotiating engineering contracts. (H.R. 12299)

Proposal Introduced to Study Manpower Needs

Senator Joseph S. Clark of Pennsylvania has introduced a proposal which would assign to the Federal Government responsibility for assisting in the development of policies and programs which will result in the adequate training, and useful utilization of the manpower resources of the Nation in pursuit of national goals.

Entitled the "Manpower Act of 1960," the Clark bill would require an annual manpower report of the President dealing with such subjects as anticipated requirements for various occupational groups, analyses of current manpower resources and utilization and recommended policies and programs for more effective training and utilization.

To assist the President, and to undertake a continuing program of continuing studies and appraisals, the bill would establish a three-member Council of Manpower Advisers. The functions of the Council would be primarily to "look into the future and project the needs of our country for manpower at all levels," Senator Clark said.

Bill Would Allow Pay of Travel, Moving Expenses

At the request of the U.S. Civil Service Commission, Senator John L. McClellan of Arkansas has introduced a bill to extend and broaden a program which permits Federal agencies and departments to pay moving and travel expenses for newly-hired persons in shortage categories. The existing law was originally enacted in 1958, and is due to expire in August, 1960. The McClellan bill would expand and continue the program without any time limitation.

The purpose of the program, as explained by the CSC, is "to increase the ability of the Federal Government as an employer to attract persons in shortage occupations such as engineers and scientists." Experience of Federal agencies during the two-year trial operation, the CSC reported, showed that authority to pay travel and moving expenses was a very important factor in effective recruitment, and contributed to create a much stronger competitive position with industry. It has resulted in the appointment of more highly qualified persons who would not otherwise have been available for Federal employment, the Commission added.

Sperry Engineers Group Vote For Affilation with Union

Moving up the time schedule in their bid to affiliate with the International Union of Electrical Workers, the Sperry Engineers Association has voted in favor of affiliation on their two required ballots by counts of 435 to 258 and 393 to 274.

Originally intending to put the vote off for several months, EA leaders now state that the intense controversy aroused by the issue caused a crystallization of opinion among members, making further delay unnecessary.

To block the affiliation move, the company has applied for a court injunction to stop the affiliation pending a legal ruling on the validity of the controversial "total unit vote" clause in the present union contract. This clause requires any affiliation election to include all engineering personnel covered by the contract rather than just the forty per cent comprised by EA membership. The union contends this clause is unenforceable since it gives nonmembers the right to a voice in the affairs of an organization. The company, however, expresses confidence that the clause is legal, and has requested a Federal court ruling to settle the matter.

Other obstacles to a quick affiliation are seen in NLRB policies arrived at since the Sperry unit was determined in 1946. Since the 1946 election, in which voting units were determined by the company and the union, the separate-vote-for-professionals rule has come into effect. In addition, in a recent case involving the Standard Oil Company, the NLRB held that even though a change in union affiliation was not contested by any party involved, such an election must still be regarded as a representation question, and must be held by secret ballot "conducted with the safeguards surrounding Board-conducted elections." In view of the fact that only forty per cent of Sperry engineers are members of EA, and since only about half of the total EA membership voted in favor of affiliation, an NLRB determination of the voting unit in a representation election would further cloud the outcome, and would certainly cause the proceedings to drag on for some months.

Seasonal Decrease Shown In Demand for Engineers

One-fifth more engineers were looking for jobs in January than in November, according to a recent survey by the Department of Labor.

Although an increase in demand for electronics engineers was seen resulting from greater missile allocations, the long-term trend away from manned military aircraft further reduced the job opportunities for aeronautical engineers in the larger aircraft production centers. The influx of mid-term college graduates contributed to the increase in the supply of engineers, and whole half of the geographic areas reported a reduction in the number of job-seeking engineers, the nation-wide total

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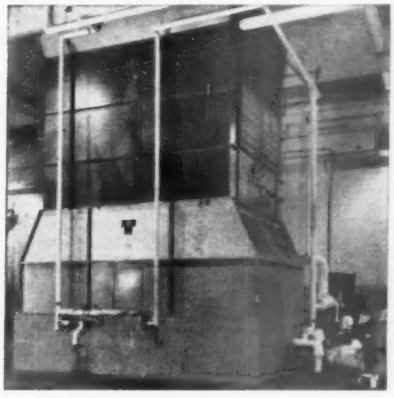

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showed a rise in the number of applicants at public employment offices. The figure rose from 4,138 in November to 4,941 in January, an increase of nineteen per cent.

All engineering fields except chemical showed an increase in the number of job applicants, with aeronautical engineering job seekers increasing by seventy-seven per cent over November.

In contrast, a comparison of January's job market with that of the previous January, shows a total drop in engineering unemployment of 22.6 per cent, with aeronautical engineers posting the only setback.

NLRB Has Split Decision On Status of Draftsman

Disagreement on how to apply the *Litton* and *Western Electric* decisions has resulted in a split decision in the inclusion of a draftsman in a production unit at Freeman Loader Corporation, Peru, Indiana.

In holding that the draftsman did not meet the *Litton* criteria for technical employees, the majority of the NLRB panel reasoned that since the job did not require independent judgment, and since the work did not "require the exercise of specialized training usually acquired in colleges or technical schools or through special courses," the draftsman could not be considered a technical employee.

The vigorous dissent of panel member John H. Fanning, however, contends that the ruling conflicts with the principles set out in the *Western Electric* case, where the nature of the work performed rather than the qualifications of the individual determine employee status. Mr. Fanning argues that since the draftsman involved performs the same work as other draftsmen who have "customarily" been considered technical, he too should be excluded from the production unit. The majority views Mr. Fanning's reasoning as a departure from the *Litton* decision.

High and Dry

When engineers sheared off the top of a hill in Tampin, Malaya, to make room for a microwave radio relay station they wisely avoided a mammoth boulder just below the surface of the original elevation. As a result today an antiquated wooden shack stands perched atop the stone in arresting contrast to the modern radio structure nearby.

Ineffective Communications Affecting Nation's Advance, Says Bell Executive

A lack of effective communication between scientists and engineers is slowing the nation's technological advance.

That is the opinion of Dr. John R. Pierce, director of research-communications principles for Bell Telephone Laboratories in Murray Hill, N. J., who gave the keynote address at a one-day conference sponsored by New York University's Office of Special Services to Business and Industry.

The conference had as its theme "The Critical Million—How to Talk to the Nation's Scientists and Engineers: Industry's Most Vital Audience."

According to Dr. Pierce, the flow of technical and scientific information has broadened beyond the ability of the individual to assimilate and use, and this problem is compounded by ineffective communications within the scientific and engineering community.

"Our scientists and engineers," he said, "are served by a chaos of too many meetings and too many specialized publications. There are no universally read scientific or technical publications. While the scientists and engineers read newspapers and popular publications and trust these outside the field of science, bitter experience has made them wary of science news. They can become alerted but not more informed through popular channels."

Frank Coss, vice president of Scientific Technological Communications, Inc., New York consulting firm, told the conference participants that the problem of circulating vital scientific and technical information is growing more acute because of the lag in improvement in communication techniques.

"We find ourselves, paradoxically, setting up radio communication with other stars, hoping that intelligent life may be there and anxious to talk with us," Mr. Coss pointed out, "and meanwhile we have difficulty learning what the engineer in the next department is working on."

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Strictly Business

Personalities . . . **John Oster, Jr.,** president, has announced the appointment of **Alan Bate** to the newly created post of vice president in charge of engineering of the Product Division of the **John Oster Manufacturing Company,** Milwaukee, Wis. . . . **Michael H. Pelosi, Jr.,** has been named director of engineering for **CRS Industries, Inc.,** Philadelphia, Pa. . . . The appointment of **Alexander W. McPherson** as product development engineer for the **Detroit Stamping Company,** Detroit, Mich., has been announced . . . **The National Coal Association,** Washington, D.C., has announced the appointment of **Samuel F. Stepp** as staff engineer in its Bituminous Coal Institute Department . . . **Lonay Nelson** has been named chief engineer of **Hyster Limited,** with headquarters at Glasgow, Scotland . . . **W. E. Robb** has been appointed project engineer with the **Webster Engineering Division** of **Midland-Ross Corporation,** Tulsa, Okla. . . . **Lawrence T. Garnett** has joined the staff of **Robertshaw-Fulton's** Aeronautical and Instrument Division, Anaheim, Calif., as a senior development engineer . . . **Thomas M. Dahl** has been named manager of the Chicago, Ill., office of **United Engineers & Constructors, Inc.**

Mr. Bate

The promotion of **Edward W. Ruhe** to the newly created position of chief engineer of the Engineering and Maintenance Department of **Olin Mathieson Chemical Corporation's** Metals Division plant, East Alton, Ill., has been announced . . . **Fred S. Dubin Associates,** Consulting Engineers, has announced the appointment of **A. Roger Kelley** as associate and manager of their New York office . . . **James F. Nichols** has been named chief engineer of a new product development program of the **Arguto Oilless Bearing Company,** Philadelphia, Pa. . . . **Fred A. Compton** has been named a director of **The Hinchman Corporation,** while **Edward T. Vincent** has been named associate and consultant of the Detroit, Mich., firm . . . **Parke, Davis & Company,** Detroit, Mich., has announced the promotion of **Carl W. Lintner** to superintendent of overseas engineering . . . **E. Bernard Meyer** has been named assistant chief engineer for **United States Steel's Universal Atlas Cement Division,** New York, N.Y. . . . **Arthur D. Benjamin** and **Peter Flack** have announced the formation of a new firm to be known as **Benjamin & Flack,** Consulting Engineering, New York, N.Y.

Mr. Nichols

James Petrides has been appointed director of property development for **Mobilife Corporation,** Sarasota, Fla. . . . **Lewis M. Duckor** has been appointed vice president of engineering for **Colvin Laboratories, Inc.,** East Orange, N.J. . . . **Lublin, McGaughy & Associates,** Washington, D.C., has announced the appointment of **Alfred Mercado** as director of planning . . . **J. Rowland Doyle** has been named to the post of chief engineer of **The Cleveland Trencher Company,** Cleveland, Ohio . . . The election of two new vice presidents of **Stone & Webster Engineering Corporation** has been announced by **F. W. Argue,** president. They are **Theodore E. Casselman, Jr.,** manager of the firm's New York office, and **Wilbur S. Roberts, Jr.,** manager of the firm's new business activities . . . **Leland E. Wells,** formerly director of engineering of **Exide Industrial Division** of **The Electric Storage Battery Company,** Philadelphia, Pa., has been promoted to vice president-engineering of the division . . . **R. W. Hodgers, Jr.,** has been named manager of engineering for the X-Ray Department, **General Electric Company,** Milwaukee, Wis. . . . **George A. Work** has been appointed chief project engineer of the **Leach Corporation's** Special Products Division, Compton, Calif.

Mr. Doyle

William A. McAlister has been elected president of the architect-engineering firm of **Thomas J. Davies, Inc.,** following the affiliation of that firm with **Engineering Service Corporation,** Los Angeles, Calif. . . . **Donnell H. Wagner** has joined **Baxter Laboratories, Inc.,** Morton Grove, Ill., as chief engineer . . . **Leo Tobacman** has been appointed chief engineer in the Airborne Mechanisms Division of **Randolph Mfg. Co.,** East Cleveland, Ohio . . . **Howard L. Waldron** has accepted a position on the engineering staff of **Barodynamics, Inc.,** Georgtown, Colo. . . . **Ray D. Gardner** has been named chief engineer of **Horkey-Moore Associates,** Torrance, Calif., a wholly-owned subsidiary of **Houston Fearless Corporation . . .** The **Portland Cement Association** has announced the appointment of **George K. McCord** as Wisconsin district engineer, with headquarters in Milwaukee . . . **Anthony L. Tendler** has been elected vice president for engineering of the **Hammond Organ Company,** Chicago, Ill. . . . **John C. Saboe** has been named a quality control engineer by **International Resistance Company,** Philadelphia, Pa.

Mr. Tobacman

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The Jets Bring New Challenges for Hard-pressed Engineers

COMMERCIAL aviation sped into the jet age last year while air experts were still grappling with the problem of finding faster and more effective means of providing air traffic control.

This rapid switch to jets ushered in a new era in aviation, but at the same time it multiplied problems of traffic control on already crowded airways. Today, air travel by everything from jets to single-engine sport aircraft is mushrooming—experts believe it will double its present level by 1975—and placing emphasis on the needs for new engineering answers to traffic control.

Faced with these facts, engineers of the Federal Aviation Agency and dozens of private firms across the country are turning their efforts to research on new methods which can cope with the jet era necessities. The FAA's Bureau of Research and Development has invested more than $34 million in projects for the modernization of air navigation and traffic control systems.

Much of the engineering effort is being directed toward providing automated processes replacing the slower, essentially manually operated control systems. With the rapid development of automation, it appears that soon the tedious task of flight data processing and handling will be taken over by complex electronic computers, leaving the human controller with greater freedom and time for decision-making.

This engineering marvel—known officially as the Data Processing Central—is the keystone of the FAA's effort to modernize traffic control. The equipment, developed by General Precision Equipment Corporation of New York, is currently undergoing tests at FAA's 6,000-acre research facilities near Atlantc City, N. J. Out of these tests may come a new engineering answer for air safety and convenience.

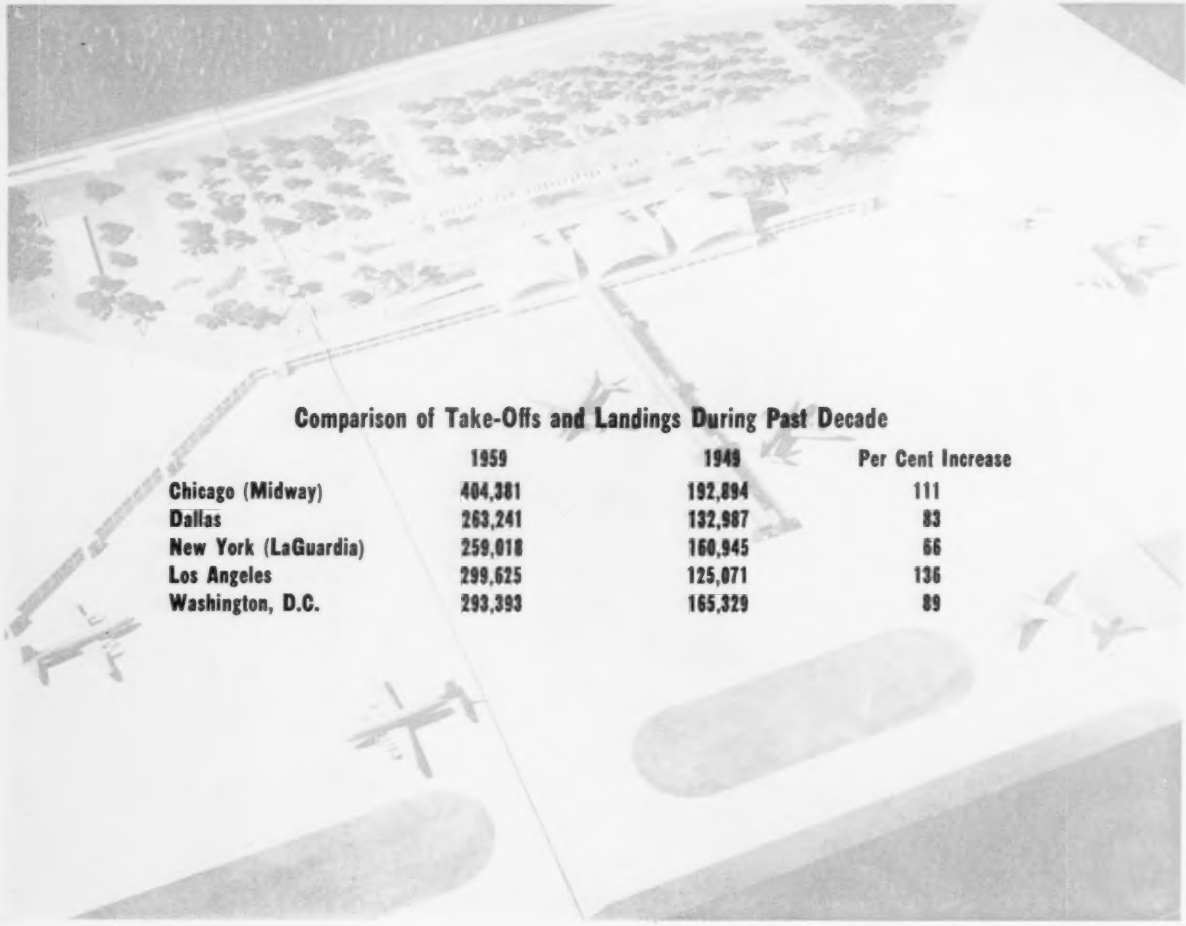
Under the present system, FAA's controllers in airport towers across the nation do a herculean task of directing the growing traffic. The control system has developed gradually over the past thirty years with many innovations and improvements—the introduction of radar during World War II being one of the biggest.

In spite of these improvements, the control system remains very much a manual operation. For example, flight progress strips are drawn up by hand; flight postings are done manually, and computations and analysis of flight progress are manual operations.

This manual system, developed through on-the-job experiences, is performed by amazing skill by these FAA controllers. But as air traffic has increased, the system has been burdened by more and more detail. Often the controller is bogged down by a mass of clerical detail which must be done manually, and, in the interest of safety, flights must sometimes be delayed until these details are out of the way.

Traffic is increasing tremendously in both speed and number, further burdening the already overworked controller. Today, more than fifty million people travel by air each year and by 1965 this figure is expected to be something like 100 million. And the new and speedier aircraft are compounding the traffic crowding. For example, it takes 1,200 square miles of sky 2,000 feet deep to reserve the necessary airspace for a 600-mile per hour jet on a instrument flight operation.

Controllers in an FAA tower checking on the progress of flights in their area. Much of detailed manual operations required of these controllers may be taken over by new data processing equipment as part of a modernization of air traffic control.



Comparison of Take-Offs and Landings During Past Decade

	1959	1949	Per Cent Increase
Chicago (Midway)	404,381	192,894	111
Dallas	263,241	132,987	83
New York (LaGuardia)	259,018	160,945	66
Los Angeles	299,625	125,071	136
Washington, D.C.	293,393	165,329	89

Few of the nation's fifty million passengers fully appreciate the complex human and engineering problems behind the control of the nation's airways. On a typical flight, the system begins when the pilot makes up his flight plan and it is filed at the appropriate air route traffic control center. The flight plan includes the type of aircraft, its identification number, its destination, speed, desired altitude, route and expected departure time. Controllers can then use this information to probe for potential conflicts of flight plans. If a conflict is discovered, the controller advises a change in the flight plan to comply with established separation criteria.

Information is recorded on flight progress strips and communicated verbally to all appropriate controllers along the route of flight. The flight progress strip is kept up-to-date by similar communication between controllers and the pilot as he reports his position along the way.

The increasing traffic and speed raises serious questions as to how long a manual system, with all of its accompanying bookkeeping necessities, can cope with control, especially in heavy traffic areas. The answers, many experts believe, must be an engineering solution—automation.

This automation, as envisioned by the FAA and its prime contractor, GPL, would unburden the controller and leave him free to make decisions. How could an electronic brain take over this myriad of complex functions? The developers of the system describe a typical flight, under automated data systems, in this manner:

Before takeoff the pilot will file his flight plan just as he does now. The information, his plan—the type and identification of aircraft, its route, estimated time of departure, cruising altitude and speeds—will then be inserted in proper code format into an en route computer in the air route traffic control center.

At a pre-set time before scheduled takeoff, the computer will automatically activate the plan. This means a series of flight progress strips will be automatically printed and distributed to control positions having jurisdiction over the flight. Controllers at these positions will mount the strips on the displays of their consoles.

When the pilot is ready to take off and requests taxi clearance from the ground controller in the tower, his request is relayed to the center. A controller will insert the estimated departure time directly into the computer by means of a keyboard at his fingertips. The computer will then probe its memory to see if there is a conflict or violation of the criteria for safe separation between this flight and any other.

If there is no such conflict the computer will send an automatic signal back to the tower and the local controller in the tower will clear the aircraft for takeoff. If there is conflict, it will be displayed to the controller along with alternative flight plans. He will then send the computer a new clearance that will simultaneously be displayed in the tower.

At takeoff the local controller, using a keyboard, enters clock time into the computer and the computer automatically activates the flight plan information, computes estimated times to check points along the route, and causes punch and print units to prepare flight progress strips for control sectors with the center.

The flight information is then passed along from center to center and is updated as necessary when enroute fix reports are received from the aircraft. At the various consoles where controllers have posted the flight progress strips, an automatic printing machine moves up and down keeping strips updated with new flight data as it is punched on a keyboard by controllers. Lights beside each strip signal to call the controller's attention to new formation or a potential conflict discovered by the computer.

If the computer discovers a possible collision situation, it immediately presents the information on a pictorial display. The controller then inspects the data and changes the clearance of one or more of the aircraft, eliminating the conflict situation.

Near the end of the flight, jurisdiction is transferred to transition control and radar procedures are instituted using "track while scan" elements that feed the aircraft's position directly into the computer. On a pre-programmed basis the computer continually calculates time to touchdown, using appropriate distance and altitude information for the type of aircraft involved and automatically makes up the landing sequence. Assignment of a runaway time slot is made by the controller after which the computer and its associated consoles and display help the controller provide instructions for path stretching and speed adjustment enabling the pilot to make good his assigned landing time.

This system, then, would almost completely revolutionize the traffic control process. The human element—the controller—would be relieved of virtually all of the routine functions by these complex engineering marvels. Essentially the system incorporates advanced engineering achievments which have already automated many functions in business and industry. While efficiency is a prime goal in industry, safety becomes a priority item when the FAA adopts these new engineering modernizations.

New engineering advances hold out hope that the number of air crashes and near misses can be reduced. The problems of speed and congestion in the jet-age of commercial aviation are putting more burden on the imagination of engineering safety experts.

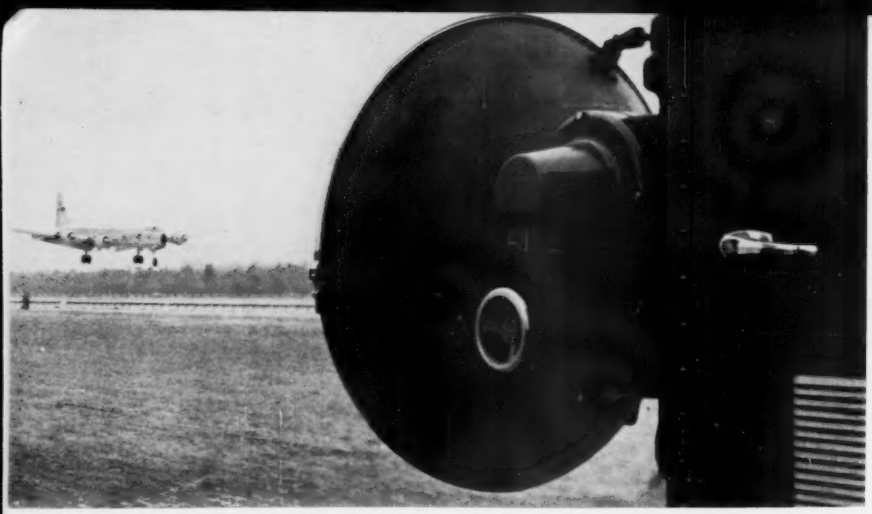
Replacing the manual system of control, with semiautomatic methods is, of course, just one of the many engineering attacks on the problem of air safety and efficiency. Here, we are primarily concerned with new methods of traffic control, but there are dozens of other projects in which engineers are actively involved—airports are being remodeled and modernized to handle jet-age traffic; communications systems are being revolutionized; developments are moving rapidly toward providing pilots with the means of navigating with pinpoint precision.

Some of these engineering efforts in traffic control are simply an extension of existing procedures and equipment. Others, now in the test stages, are as futuristic as some of the aircraft they are designed to control.

One of the systems being checked out by FAA is an automatic aircraft landing system designed to handle landings during bad weather.

The system, designed by Bell Aircraft Corporation, provides fully automatic "hands off" control of the airplane throughout the final approach and touchdown on the runway. It also allows for the pilot to take over control at any time.

To land an inbound airplane, the tracking radar "locks on" the plane when it flies through an electronic window or gate from



One of the new devices being tested by the Federal Aviation Agency is Bell Aircraft Corporation's new automatic all-weather aircraft landing system. Here a C-54 is landed by the system at the National Aviation Facilities Experimental Center near Atlantic City, N. J. In the foreground is one of the two radar antennas used in the system.

two to four miles from the end of the runway. It is at this point that the pilot relinquishes control of the airplane to the system.

Should the airplane be too high or too low, too far to the right, or too far to the left, corrections are transmitted to the plane's automatic pilot. If the airplane should not be maintaining the proper rate of descent or glide path or if it is not aligned with the runway the system gives it an automatic "wave off." It also provides a safety feature for a "wave off" when a second plane is in danger of overtaking the first in the landing sequence.

Originally designed for the U. S. Navy for use on aircraft carriers, the system has successfully landed more than 4,000 planes on land and carrier decks during its development.

A technician uses an oscilloscope to check the operation of a high speed buffer memory drum in the Data Processor unit now being tested for use in air traffic control. The processor is a key unit in the experimental semiautomatic control system.

THEN there is the Taxiing and Routing of Aircraft Coordination Equipment Project, which is appropriately nicknamed TRACE. The FFA is developing this project with the primary purpose of speeding surface movements in an effort to prevent taxiing operations from becoming a bottleneck in the air control system.

The TRACE system consists of sensing devices which detect moving aircraft on taxiways and runways relaying the positional information to the control tower where it is displayed on a panel consisting of indications of aircraft position on an airport overlay. Using this information, it would be possible for the controller to give taxiing instructions to the pilot either by radiotelephone as he does now or, possibly, through the use of signal lights located along the runways.

Even the communication systems—the vital area of traffic control—are undergoing automation. Part of this project, known as Automatic Ground-Air Communications System (AGACS) would make possible mechanized communications between pilots and the data handling systems on the ground. This, the FAA points out, would relieve congestion on voice channels and provide time for non-routine messages and emergency uses.

Ever since World War II, radar has played an important part in modernizing and making safer traffic control efforts. New long-range radar systems have greatly increased the effectiveness of the ground control and the location of aircraft in high density areas. An even newer three-dimensional radar system promises to further increase its effectiveness.

This 3-D radar would give ground controllers information on the height of aircraft over a range of fifty nautical miles. This, air experts hope, will give the answer to the long-standing problem of furnishing the human controller with height information without resorting to the usual method for radio-voice communications. Presumably this would relieve congestion for both the communications channels and the controller.

Three-D radar, Data Processing Central, AGACS, ALS are just a few of the engineering and scientific projects which are part of an over-all effort to make the control of air traffic safer. There are many others—most of them evidence of the engineering profession's contribution to this vital field.

Why all this concern and effort over traffic control?

In 1942, control towers at the nation's airports handled 9,208,776 aircraft operations (takeoffs and landings). By 1958, the operations had increased to 26,599,719 or a whopping 189 per cent.

Today, there are more than 110,000 aircraft using the airspace over the U.S. Back in 1938 there were only 22,000.

It's obvious from just this handful of figures that airspace—once considered to be an almost unlimited resource—can get crowded. And when it does become crowded the needs for control of traffic are acute.

The entire aviation industry, the engineering staffs, the airline owners, the pilots and everyone else, have a real stake in improving the safety and convenience of air travel. Despite the industry's over-all good safety record, the public's confidence is often badly shaken by reports of "near misses" and tragic air crashes.

Stuart G. Tipton, president of Air Transport Association of America, testifying in favor of the bill which created the FAA back in 1958 summed up the situation this way:

"It is obvious to those of us in aviation that with the best performing military and civil airplanes that can be manufactured in the world, the most advanced aircraft operating techniques all are to little avail unless all the aircraft that are now operating in the airspace and the many thousands that will be flying in the near future can be operated safely and efficiently."

Engineers have provided the world with finest, speediest and most comfortable transportation. Now they intend to make certain that it is also the safest.—**End.**

As these photographs show, many of the controllers' tools are manual. Data must be posted by hand including such important information as position, speed altitude and heading. This system operates with surprising efficiency today, but the increasing numbers of aircraft plus the speed of new jet aircraft is putting more and more of a burden on this manual operation. The FAA is testing new semiautomated systems which will free controllers for decision-making tasks.

Professional Profiles

Alfred Mercado, P. E., has had a hand in the planning of urban and industrial projects throughout the world.

When engineers get together to talk about city planning the name of Alfred Mercado, P. E., is almost certain to come up in the discussion.

Mr. Mercado, whose official title is director of city and regional planning for Lublin, McGaughy and Associates of Washington, D. C., has participated in redevelopment and planning projects everywhere from Libya to Seattle, Washington.

He is just back from two years in Europe, Africa and the Middle East. While overseas, he planned operating and community facilities for six major U. S. bases in Italy, Libya, and Turkey and completed a 15-year development plan for a large pharmaceutical complex in Italy.

Before the two-year foreign stint, Mr. Mercado had played major roles in some of the bigger U. S. development projects. He planned the $47 million Port Development Project for Houston, Tex., the $100 million Industrial Development Program for Seattle and conducted the Lower Manhattan Study for the regeneration of the financial district of New York City.

Earlier, he served as consultant to the Jersey City, N. J., Redevelopment Authority and as a planner with the New York City Planning Commission. During his tour of duty with the New York Commission, he prepared plans for the development of a 3,000 acre industrial area on Staten Island and analyzed the requirements for the new Civic Center in the Borough of Queens. He also collaborated with the Port of New York Authority in drafting a new airport zoning ordinance for New York.

Mr. Mercado has had his share of experience with planning in small and medium sized communities. As assistant director of planning for Middlesex County, N. J., he consulted with twenty-five municipalities in the county on master planning techniques, schools, recreation, traffic and bus facilities as well as zoning and redevelopment.

He is a registered professional engineer and is a graduate civil engineer with a masters degree in city planning from Columbia University's School of Architecture.

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

Several Vital Bills In 86th Congress Of Engineering Import ►

As this is written, Congress is in the final stretch of the 86th Congress, with an adjournment target of July 4. To achieve this date the pace will have to step up considerably, with a number of night and Saturday sessions in the offing. It is a virtual necessity for Congress to wrap up its business by the end of that week, with the Democratic National Convention starting on July 11.

The race against the calendar may well determine the outcome of several vital bills, including the NSPE-backed self-employed retirement legislation, now closer to passage than at any time during the past ten years. Several members of the Senate Finance Committee who are opposed to the bill, as modified in Committee and endorsed by the Treasury Department, have vowed an all-out fight against it. They have threatened a "prolonged" debate which, if not squelched by the leadership, could kill the bill. Much will depend on how vigorously the Senate leaders of both parties push the measure. It is indicated that if the bill gets through the Senate in its revised form—permitting a ten per cent annual deduction up to $2,500, provided employees are also covered in a nondiscriminatory pension plan—the House will accept the Senate bill and speed it to the White House before adjournment. With Treasury Department blessing it is now considered likely that the President would sign the bill.

◄ *Funds Added for Housing Urban Renewal Grants*

The House Banking Committee has added $100 million to a housing bill for community facility loans, including water and sewer projects. In addition, the measure would add $500 million to funds available for college housing loans and $450 million for urban renewal grants. The Senate committee had previously added the same amount for college loans and $350 million for urban renewal and slum clearance. Both measures, however, go beyond Administration recommendations in several respects, including additional funds for housing, and may face a veto unless cut back on the floor or in conference.

Administration Offices Aid in Building College Classrooms ►

Meanwhile, the Administration has offered some liberalizing changes in its program to help colleges build needed classrooms. Arthur S. Flemming, secretary of Health, Education and Welfare, told a Senate group that the Administration would now be agreeable to larger Federal grants to help colleges pay off private construction loans over a longer period of time, but it still wants to operate the program within a framework of a debt retirement formula rather than a Federal loan program which the colleges have used for the past ten years. Part of the argument centers around the claim that the colleges have been borrowing the money at less than cost and should now pay higher long-term interest on the 30-40 year loans. The Administration prefers to junk the college housing loan program and combine it with a new class-room aid into a grant program, with the Government making grants to help repay private loans. Mr. Flemming's concession was that $237 million in housing loan applications be handled under the old loan program, that the Federal project share be raised from twenty-five to thirty per cent and total grants from $500 million to $600 million. Also, Flemming expressed willingness to modify the Administration proposal and spread out the program from twenty years to thirty-five years.

eliminate the requirement for colleges to show unavailability of their own funds, and have money held in escrow for three years for eligible public colleges which because of a legal debt ceiling or other reasons could not immediately take advantage of the program.

Air Pollution Control Act In Jeopardy ►

The Air Pollution Control Act is also in jeopardy as time runs out. The bill was introduced last February but has been languishing until recently when it was given active consideration by the Senate Public Works Committee. However, the House committee has not acted upon similar legislation. The bill would authorize the Surgeon General to hold public hearings on air pollution problems that are of broad significance or interstate in character. A leading House figure in this subject, Rep. Kenneth A. Roberts of Alabama, declared that the House was unlikely to get to the legislation this year, but he expressed optimism for such action in the next session. Rep. Roberts pointed to the increasing concern of Congress for the problems of air pollution as evidenced by a recent Act, now signed by the President, directing the Surgeon General to report within two years on the effects of vehicle exhaust fumes on human health. The pending Air Pollution Control Act would also remove the 1964 deadline of the present law and the limit of $5 million of annual appropriations established in the 1955 law.

◄ Water Inventory Planned this Year

The Geological Survey plans to conduct an inventory of water use in the United States in 1960. Increasing demands for water are approaching the limit of clean fresh water the service declared, although large quantities of water are still unused because they occur at unwanted times and places. The inventory will be made by field personnel as part of their job of investigating the quantity and quality of the Nation's water resources. The study will be compiled in six general categories: (1) public supply; (2) self-supplied industrial; (3) steam-electric utility power plants; (4) irrigation; (5) rural domestic, and (6) water power. These data will be tabulated by source—ground water or surface water—and by location of use such as by States and by groups of river basins.

Booklet Available On Water Resources ►

Of related interest is the publication of "Water Resources Activities in the United States," by the Senate Select Committee on National Water Resources. The 97-page document, subtitled, "The Impact of New Techniques on Integrated Multiple-Purpose Water Development," may be obtained by writing to the Committee, Washington 25, D. C.

◄ Subcommittee Recommends Change in Patent Rights

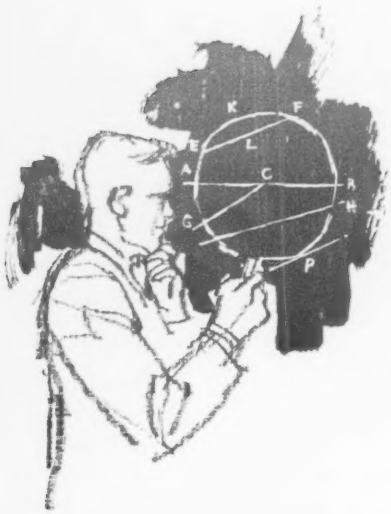
Under the Space Act patents which may be developed in research and development contracts become the property of the Federal Government. Pending legislation provides that the Agency could make a contract under which the contractor can retain commercial rights to patents—with the Government being protected by a royalty-free license. A special subcommittee of the House Science and Astronautics Committee has recommended the change. Rep. Erwin Mitchell of Georgia, head of the group, denied the bill would be a "giveaway" of Government funds. Rep. Mitchell responded that the change is necessary to avoid slowing up the space exploration program and in accord with the free-enterprise concept.

Notes in the News ►

An inventor who can devise a revolutionary wheel chair to make it easier for physically handicapped persons to move around in industrial buildings can win $5,000. Ideas will be submitted to the National Inventors Council, Department of Commerce. For details and specifications write The President's Committee on Employment of the Physically Handicapped, Washington 25, D. C.

* * *

The National Science Foundation is financing a two-week study of the effects of recent Chilean earthquakes on structures. The work will be performed by a team from the Earthquake Engineering Research Institute and the California Institute of Technology. Members of the team include several professors of engineering, an "earthquake engineer" and a geologist.



Schools Defended . . .

Let's Stop Criticizing American Education!

By
DR. JAMES E. RUSSELL
Secretary, Educational Policies Commission
National Education Association

WHEN it comes to judging the impact of education, personal experience is of little worth. The thing that is worth something is scientific knowledge. That means information collected on a wide enough base to justify drawing generalizations and verifying those generalizations by empirical test. Education has a large and rich collection of such knowledge. I would not make this point if it were not for the fact that there are voices in the land saying things about education which are not based on valid generalizations or are based on misinterpretations of fact. These voices can cause some trouble. Here are some examples.

First, let us look at a former President of the United States, Herbert Hoover. Two years ago, right after Sputnik went up, Mr. Hoover made a speech. Speaking of the deficiency in engineering graduates, he said:

"The origin of this deficiency is well indicated by a careful sampling taken not too long ago, which showed that under twelve per cent of the high school students were being taught the elements of algebra and geometry; something under nine per cent were being taught elementary chemistry; and under five per cent were being taught elementary physics. And this wretched record has further implications. . . ."

Well, now, this was an assertion of fact, subject to verification. The statistics obtained by the United States Office of Education will show us the truth.

The figure for those taking algebra was twelve per cent. Algebra is a ninth-grade subject in nearly all American high schools. In 1957, the year in which the charge was made, of all the ninth-graders in the nation, sixty-seven per cent were enrolled in algebra; an additional forty-one per cent were enrolled in courses in "general mathematics." The overlap, the excess over 100 per cent, reflects the fact that there were some students who were enrolled in both. The normal situation in American high schools was that every ninth-grader was studying mathematics. Not that there were no exceptions; probably there were. But the exceptions were so rare as not to constitute a sound basis for policy.

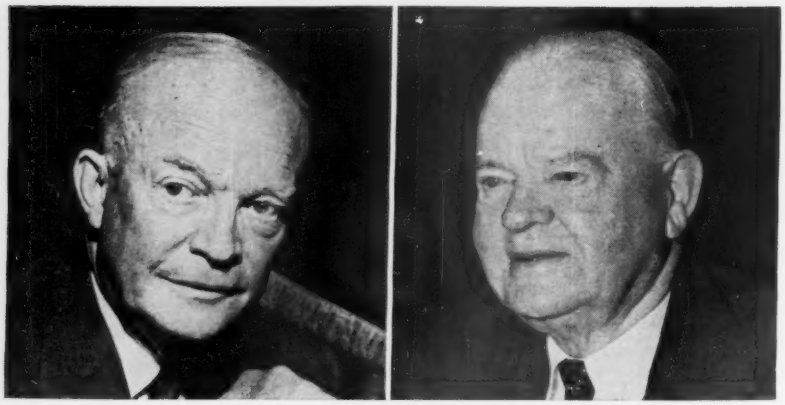
For geometry the figure again was twelve per cent. Geometry is a tenth-grade course in most American high schools. In 1956-57, forty-two per cent of all tenth-graders in the United States were enrolled in courses in geometry.

Now, chemistry. Chemistry is, in general, offered at the eleventh-grade level. It is not a course intended for the whole population. It is aimed at the abler pupils: pick your own proportion. For this figure I chose the upper half of the eleventh-grade students. Frankly, I do not think that it is a course well adapted to so large a group, but just to make the point clear I chose this figure. The number enrolled in chemistry courses in 1956-57 equaled seventy per cent of the upper half of all eleventh-graders in the United States.

How can it happen that a man of Mr. Hoover's stature would find himself in such an embarrassing situation? There are some valid reasons. About 1949, a study was made of high school enrollment in various courses; this was probably the "careful sampling" to which he alluded. This study took the enrollments in all grades, seven through twelve, as a figure for the high school population. Then it expressed course enrollments as a percentage of that figure. Thus, instead of expressing physics enrollments as a percentage of those eligible to study physics, the study expressed it as a percentage of all the children in all high schools. Thus, Mr. Hoover had some figures which were reliable in the precise context in which they were made public. But he misrepresented them and put himself in an embarrassing position because he did not have, or did not seek, the professional background to interpret the data he used. The conclusion he drew from these data—namely that enrollments in these subjects should be increased—was not indicated by the data. Educational questions should be approached with some respect for professional knowledge.

Here is another example. In November, 1957, President Eisenhower began a series of "Chins-up Speeches," following the launching of Sputnik. In his Oklahoma City speech the President said:

'Two Distinguished Critics' . . .



Both President Eisenhower and Past President Hoover come under scrutiny by the author for not telling the whole story when discussing American education.

"I wish that every school board and every PTA would this week and this year make one single project their special order of business. This is to scrutinize your school's curriculum and standards. Then decide for yourselves whether they meet the stern demands of the era we are entering.

"As you do this . . . remember that when a Russian graduates from high school he has had five years of physics, four years of chemistry, one year of astronomy, five years of biology, ten years of mathematics through trigonometry, and five years of a foreign language."

All of us will agree, I am sure, that we do need to scrutinize our schools and to appraise their ability to serve us well in these complex times. But whether we should look to Soviet schools as a model is another question. Here are some of the things that the President did not say about the Soviet Ten-Year School, which is the school he was talking about. He did not say that it was a selective operation which reduced the number of students who came out at the top. Fewer than one-half of the students even got into the last three years of this school, and only about one-third graduated. He did not say that the rigid uniformity of this school's course of study failed to provide the needed education, even by Soviet standards. He did not say that the features of Soviet education that some Americans (including the President, unfortunately) were praising were the very features that those who knew the most about these schools were criticizing: namely, the overstress on academic subjects, the overdependence on memorizing, the overhard work done by pupils, and the motivations of the pupils. He did not say that Soviet criticism of these schools was so intense that the Soviet government was about to abolish them. None of this was said.

LATER we will say more about this Soviet curriculum. Here we should say that the "lesson" implied by the President has no relevance for us whatsoever. You cannot attribute Sputnik to some presumed magic in the Ten-Year School. This school was a new invention. The best Soviet scientists were educated before it came into existence. In many cases, they were educated in other countries. The President's implied praise was little more than a favorable reference to the European concept of secondary education, which we tried and rejected long ago. Thus, this kind of schooling was given an airing that it did not merit.

It is an unfortunate fact that these two distinguished critics are not alone. They have a lot of company, and many of those who delight in criticizing the schools follow the practice of making broad-gauged assertions with little—or even no—basis in fact. I am not speaking of those serious persons who have carefully studied what is done in American schools and have concluded that many improvements are needed. I share their concern. But it is one thing to make recommendations after careful and thoughtful study; it is another to shout from the housetops a batch of loose charges which can be disproven by the simplest checking against the facts.

Friends of education sometimes ask me how I respond to these noisy critics. I usually tell them that I never respond in personal terms, but that I do have a way of looking at the situation which they might find helpful in understanding what is going on. There are a few simple realities about American education that one should have in mind when evaluating these rather ridiculous, broad-gauged charges.

First, American education is gigantic. For nine months it involves —aside from sleeping, eating, and recreational activities—the full time activities of a full quarter of our population, if you include all the children and all the adults who are working in education. This makes it one of our prime endeavors.

Because it is so large, two conclusions can be drawn:

1. It is of interest to a great many people. An enormous number of people are involved in education and are emotionally concerned about it.

2. You can assume, simply because of its size, that any conceiv-

able educational practice will be found somewhere.

So, if you want to find some pretty weird practices in education, you will surely succeed. I keep hearing about high schools that offer courses in fly-casting. For some years I helped administer a project at Columbia University; we worked with 3500 high schools. I cannot tell you how many high schools I have been in, but the number is large. I have never seen one of these courses. I am not saying that they do not exist. In fact, I would argue, simply on the mathematical probabilities, that they do exist. But I will be darned if I know where.

Another simple reality about American education is that it is expensive. It is very expensive, and it is going to be more expensive; it is not going to be cheaper. That means that everyone who is worried about expenditure of public moneys is worried about education.

Here you have the combination: You have something that everyone is interested in. You have something that is so big that it is going to have its lunatic fringe. You have something that is so expensive that people who want to cut down on public expenditures are going to focus on it. What would you predict under these circumstances?

I would predict sensational charges rooted in extreme examples and designed to capture the front pages and public-relations attention. This is, of course, precisely what you have.

To me, the sensation hunting which now surrounds education underlines the importance of approaching educational questions with reasonable humility and respect for professional knowledge. With such an approach, it is not difficult to make sense on schools. Without it, no good can result.

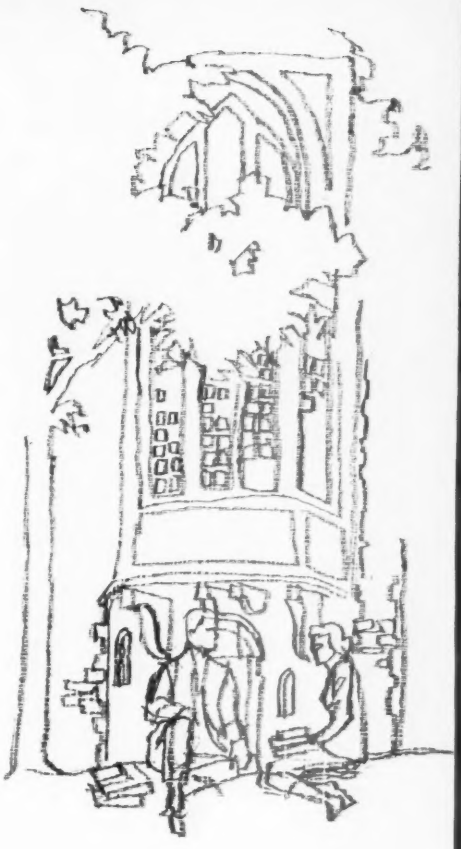
Now let us go to the question: What kind of education contributes to national strength and security?

Obviously, such education must be universal. In the society in which we live, we can afford to leave no man uneducated. If there is a human potential to develop, it must be developed, or else we can assume that societies with equivalent genetic potential will develop that potential more fully and thus surpass us. And if we posit, as we do, that we are not alone on this planet, that we are in some kind of race, then simple national welfare demands that every potential be developed. This means universal education.

This, I think, is the real argument against the proposals for concentrating educational resources on an elite. We need the elite, but we also need to have everybody educated to his maximum. We need the intermediate people, and we need to utilize every human potential in the United States all down the line.

Universal education is the central lesson that modern society teaches to man. Our society was the first to embark on universal education, and this is why the whole world comes here to learn how to do it. There have been societies that thought of universal education in terms of literacy—simple reading ability. But our society developed the thesis that secondary education should be made universal. We are not there yet, but we are getting pretty close to it.

But universal education cannot be uniform education. Education adapted to the whole of a population must of necessity be highly diverse. You cannot act on the assumption that all people are infinitely educable and can be educated the same way. That was the assumption on which the Soviet Union designed the Ten-Year School, and in that assumption the Soviet Union has run right smack into a brick wall. The trouble in the Soviet Union comes from the fact that their ideology tells them that all people are infinitely educable and can be handled in the same way. The facts challenge this ideology; so they are having a little trouble there right now, figuring out how they can back off from an ideological "truth" without making it untrue. They are now in the process of diversifying the educational experiences offered to their people. This is, of course, a necessary thing, but is it hard for them to do.



Good schools for America must combine universal and diversified education. Education must be universal, endlessly proliferated, on the one hand, and endlessly diverse on the other, involving various types of education for various types of individuals. These conditions naturally make for a complicated educational system, which is very hard to evaluate, and that may lead to some annoyances. Here is an example:

Some school critics have made the point that "any businessman knows" that the high school graduates we are getting today are not as well-educated as they were twenty years ago, or forty years ago. This is stated as one of those things that common sense teaches. Einstein said that common sense is a layer of prejudice laid down before the age of eighteen. There is something in that. Certainly, what "any businessman knows" is, in this case, contrary to observable truth.

What has happened is this. Fifty years ago our secondary schools educated a narrow spectrum of our society, about five to ten per cent of the children of high school age, mostly from the favored segments of the society. Today eighty to

ninety per cent of the entire age group is enrolled in the secondary schools. About half of this group—generally the upper half, socially and academically—go on to college and thus never become part of the job-seeking "high-school graduates" whom businessmen employ. Now let us go to the lower half of this high school spectrum, the group which does not go to college today and did not go to high school yesterday. The people in this group are less generously endowed academically and economically, and they learn far less at home than the college-bound group. This is the group which is "obviously less well educated than twenty or forty years ago." What sense does it make to compare this lower half of the modern spectrum with the top five per cent of the ancient spectrum? What sense can it make to go on from that mistaken premise and conclude that the schools have deteriorated?

The schools used to be selective; now they are universal. Now they have the problem of finding some form of education which is appropriate for every individual. If the assumption is made that the pattern of education can be exclusively academic, the result will be courses of study which are not appropriate for some children. If you then require these children to take such courses, there is bound to be a tremendous waste of human resources and a cruel frustration of some little children who are forced to try to jump academic hurdles they cannot get over. They end up memorizing their courses, just as we have seen the Soviet pupils doing. We have seen Soviet children taking a trigonometry course, working for years to memorize answers to questions they know are going to be given in an examination. They memorize these answers and hold them long enough to give them back on the exam. Then Soviet leaders criticize the schools for not teaching trigonometry. Of course they did not teach trigonometry. What they taught was a few rote answers which the students would finally, by dint of painful effort, learn to parrot back. This is not education. It is not even worth worrying about. The Soviet schools' experience merely confirms something we already knew: namely, that universality entails diversity, and diversity entails a variety of levels and types of schooling.

Strengths and Weaknesses in American Education

I discuss the above together because I think that many of our American strengths are also our weaknesses.

I have just cited universality. This is a universal system, or call it a universalizing system. We have not gone all the way. With universality go a lot of the annoyances that bother educators and citizens alike. But without universality the whole thing goes down the drain. The other modern societies of the world are trying to catch up to us in this respect.

Diversity—we are diverse, but we are not nearly diverse enough. We have learned a lot, but we have not learned anything like enough to do the job. We do not know, for example, how to take a class of thirty little children in an elementary school and be sure that what their teacher does is really well adapted for each one of these children. We have tried all kinds of devices. We have "grouped" them in many ways. We group and regroup, separate the bright from the not-so-bright, put them back together again. We are pretty much concluding now that no mere pattern of organization can give us the answer; the skill of the teacher is more important than how classes are organized.

The problem is one of educating each individual child. One little child is a different person from another little child, and the learning he is going to do is his own. Learning is the product of the effort of the learner, and the learner has to learn on the basis of what he already knows. None of these children is identical with any other in this regard. Each must bring to it his own energy, which is released in terms of where he is going and not where someone wants him to go. This means that the essence of the learning process is somehow getting in contact with the child as he is. The minute you fail to take account of the child as he actually is, you lose contact with him. And when you lose contact, you are not teaching him anything worthwhile. You can make the curriculum as tough as you like, beat history into their resistant little heads, but the results will be totally different from what you intend. You will teach history; but they will learn to despise the intellectual life. There is a dreadful amount of American education—a really appalling amount—which is simply out of contact. Our problem is to find ways to get into contact, and this is not simple. It requires not only finding good teachers but also giving them classes small enough so that they can observe, and work with, every child present.

Another strength and weakness of American education is localism. Some critics oppose local control because it means that a lot of "ignorant" school-board people make decisions. Yet I do not find that the wisdom at the center, at least as thus far revealed, is such as to make me think it worth substituting for local decisions. Certainly an important part in making educational decisions must be considerations of the local situation in each school. I do not suppose that it is seriously argued that national political figures will know the local situation better than the local people.

The American society is based on intellectual pluralism; it is based on the idea that wisdom is a product of experience and that experience is found in many places. If centralized educational "wisdom" is going to depend on the noisy critics and their half-baked non-

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An Industrial Combination—

ENGINEERS AND ADVERTISING

An engineer walking into the offices on the 19th floor of New York's Lincoln Building might think he was suddenly in the midst of a technical convention.

Here, in the offices of the G. M. Basford Company everything from the details of electronic systems to the complexities of the latest chemical discovery are everyday shoptalk. As the nation's leading industrial advertising agency, G. M. Basford must be able to talk this engineering language and talk it well.

Agencies like Basford are evidence of a phenomena of growing cooperation between the seemingly diverse worlds of engineering and advertising. For the traditionalist, this may, indeed, seem incongruous. But, the necessities of a complex technical world have forced the engineer to take a hand in translating, interpreting, and communicating the new developments and products for the industrial community. And advertising and its sidekick, technical publicity, are major channels for this communication.

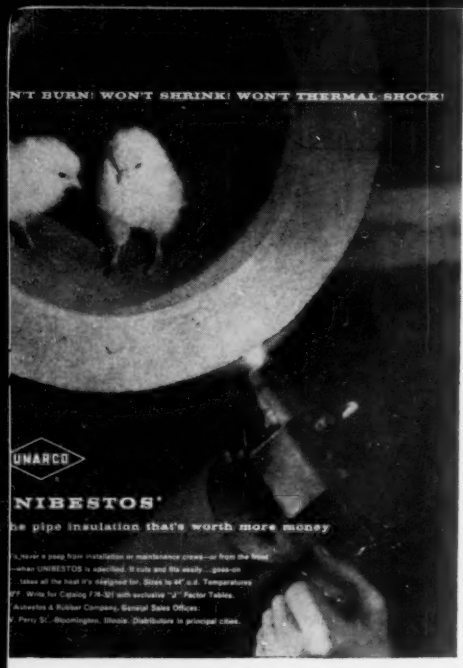
It is difficult to imagine the marvels of a new electronic computer being advertised and publicized in simple understandable English without an engineer in the background somewhere. Actually many of the industrial advertisements, particularly those appearing in the technical press, are planned, written, and laid out by engineers. About the only time an engineer is not in the picture is when the completed ad is turned over to the printer.

To find out how the engineer fits into modern industrial advertising, the AMERICAN ENGINEER talked with John Sasso, senior vice president of G. M. Basford. Sasso sees nothing strange about the presence of engineers in advertising; in fact, he indicates strongly that it probably couldn't be otherwise.

"The engineer," he says, "is taught to think clearly and logically. This training combined with creative imagination is a big asset in advertising."

Sasso has a doctorate in mechanical engineering from Columbia University and had a whirl in the practical end of engineering before he joined the communications field. Today, he still proudly wears the pin of the Society of Automotive Engineers in his lapel. He became a member of the G. M. Basford firm eight years ago after stints as editor of an engineering publication and as an editor of *Business Week*.

Advertisements directed at a technical audience can be just as attractive as those pointed to a mass consumer market. This advertisement, prepared for Crucible Steel Company of America by G. M. Basford Company, marked the first time that a "high fashion approach" was used to sell stainless steel to an audience of industrial buyers. The layout was designed to emphasize one of the product's main selling points —fine finish.



This advertisement by Union Asbestos and Rubber Company is clever and eye-catching, but at the same time conveys important information to the engineer. In the text, the advertisement gives some concrete figures on size and the product's ability to withstand specific temperatures.

John Sasso's background in engineering is not particularly unusual; in fact it's more the rule at G. M. Basford. Thirty per cent of the staff are engineering graduates and another thirty per cent have had experience in technical areas of industry. And it's a safe bet that the remainder of the staff has picked up a sizable dose of engineering lingo through the years. The president of the agency, Fred Adams, is a chemical engineering graduate of New York University, and the chairman of the board is a mechanical engineer as is the research director.

This heavy dependence on technically oriented personnel obviously has its advantages in dealing with engineering and industrial clients. First, it undoubtedly has a psychological advantage in opening doors in some areas of the industrial world. It is only natural that an engineer usually will prefer to work with a fellow engineer who can talk the same language about a product.

Secondly, it is often a prime necessity for an agency to have technically trained men who know enough of the new engineering complexities to translate them into sensible sales promotion. The agency man with nothing but a journalism or advertising background may find it difficult to meet these requirements and at the same time turn out advertising copy that will sell engineers.

However, it is not only the engineer in the agency that is involved in advertising; today, in increasing numbers, the actual practicing engineer in industry is being asked to take a bigger hand in communicating information about his company's product.

This may take many forms. Often the development or product engineer is called upon to work directly with advertising men in providing technical help in describing a new product. On occasion, he may be asked to toss in his opinion on the chances of selling a new innovation in the engineering market place.

Whatever their part in the advertising campaign, engineers almost always pass on technical industrial advertisements before they reach the public's eye. The general rule, according to Basford's executives, is for the engineer in the company to have veto power over technical advertising copy and advisory capacity over presentation.

ALL of this caution and double checking with engineering staffs has its logical purpose. Industrial advertising men will frankly admit that the engineering market is one of the toughest in the business. When it comes to special fields, engineers usually are a highly cautious group of professionals who want straightforward, accurate facts. They are often justifiably called "professional skeptics."

The engineer probably is one of the best prepared customers, usually with years of technical experience to back up his judgment.

The advertisements used to illustrate this article were prepared by three different advertising agencies. The examples point out varied methods of successful appeals to engineers.

The average buyer of an automobile or refrigerator has little knowledge of the technical aspects of the product and often couldn't care less. As a consequence, consumer advertising often is presented in generalities, but, try selling an engineer a complex motor in this manner.

Obviously, there are some drastic differences in approach between consumer and industrial advertising. Asked about some of these differences, G. M. Basford's John Sasso summed up the situation in three words: "logic versus emotion."

"You can sell girdles with emotion; but nobody ever sold an engineer a turbine on emotion," he claims.

"It takes straightforward copy with a logical presentation of the capabilities of the product," Sasso says. "You can't give engineers a bunch of left-handed generalities —they will catch you every time."

But, these strict standards on copy, as Sasso is quick to point out, do not necessarily mean that industrial advertisements have to be dull or unattractive. And he can quickly pull out dozens of examples of ads with plenty of eye appeal which at the same time contain a solid engineering message.

Not all of industrial advertising finds its way to the technical journals. There are occasions when this type of advertising appears in popular mass-appeal magazines. These advertisements, Sasso says, are an even bigger drain on the imagination than the straight technical campaigns.

"In many cases these ads are designed to reach a broad audience of both engineers and management. Here we must be careful not to talk down to the engineer or to talk over the heads of the less technically trained manager," he says.

Advertising men often spend weeks practically living with all elements of a business research, development, engineering, marketing. After analyzing reports from all areas a logical approach is developed for an advertising campaign. A few years ago a Basford man trailed various units of the Strategic

Air Command around for weeks in order to come up with the right kind of copy for a General Electric spread in *Life* magazine.

It is normal procedure for the advertising men to go to the plant, talk with development engineers, sales engineers, and industrial engineers, to see the product in action. In short, they collect as much information as possible before the ad even reaches the preliminary drafting stages.

AGAIN in this area of the advertising process, Sasso believes that the technically trained man has a big advantage. "Often a layman is baffled when he walks into an engineering laboratory; he'll be impressed by big rows of test tubes or some other obvious feature that is old hat to engineers.

"The man with an engineering background on the other hand will look past the obvious in an effort to come up with the new angles to a product—the thing that the engineer is really interested in when he studies a new product. Engineers don't particularly want to be told about something that is already obvious."

G. M. Basford, like the copy it dispenses, leaves the impression of a straightforward, down-to-earth approach, somewhat different from the usual stereotyped idea of Madison Avenue. This approach undoubtedly is not lost on the engineer clients.

In talking to the AMERICAN ENGINEER, Sasso, himself, had much of this down-to-earth attitude in a mixture of enthusiasm and pride for advertising and engineering. He left the distinct impression he would frown on anyone taking either profession lightly.

With obvious pride in his business, Sasso says that industrial advertising has grown more mature and has gained stature as a communicator of useful information. He's just as quick to demonstrate his interest in engineering during quick lapses into enthusiastic discussions of some technical development he has helped to publicize.

Sasso thinks there is a real need for more engineers with creative abilities and knowledge in the advertising and writing fields. He believes that engineering schools would do well to consider the inclusion of an engineering-journalism course in the curricula. "I remember taking a course in engineering-law at Columbia; why not a course in engineering journalism?" he asks.

This, Sasso believes, would help the engineer to better understand the problems of advertising and assist him in playing a bigger role in the communication of technological information.

There is no question that the engineer is becoming a focal point of the technical communication complex of industry. Almost monthly a new technical publication aimed directly at some specific field of engineering is born in the publishing world. And these new magazines are often fat with advertising—it, too, directed at the engineer.

John Sasso, senior vice president of the G. M. Basford Company, is a prime example of how engineers can fit into the advertising world. He has a doctorate degree in mechanical engineering.

This growing importance of the engineer in advertising and of advertising in engineering is further evidence of the increased stature of the profession in the industrial community. Every year engineers either buy or specify billions of dollars of industrial equipment and products and, today, few major purchases are undertaken by industry without engineering advice and approval. It is little wonder that advertising is taking an increasing interest in engineers.—**End.**

Many advertisements aimed at the engineering profession contain solid technical information. In this advertisement published for The Asphalt Institute, diagrams along with specific facts and figures on a particular project are presented. Engineers, advertising executives say, demand straightforward, accurate advertising.

Report on a Case by the Board of Ethical Review

The Board of Ethical Review was established to provide service to the membership of the NSPE by rendering impartial opinions pertaining to the interpretation of adopted Canons of Ethics and Statements of Policy regarding professional conduct. The *American Engineer* will print findings on specific cases as they are reported by the BER to the NSPE Board of Directors.

Case No 60-1

Subject:

Advertising—Press Releases

Facts:

Consulting engineering firms issue, or cause to be issued by their retained public relations firms, press releases announcing retention of the firm for a particular project. The press releases generally state the nature and scope of the project, the purpose and benefit of the project to the client or the public, and in many instances some factual data about the background and qualification of the firm. Two typical examples are shown as Exhibits A and B.

Question:

Does the issuance of press releases by or for the consulting firm constitute advertising of a self-laudatory nature, proscribed by Section 2 of the Canons of Ethics?

References:

Canons of Ethics, Section 2—"He will not advertise his work or merit in a self-laudatory manner and he will avoid all conduct or practice likely to discredit or do injury to the dignity and honor of his profession."

Rules of Professional Conduct, Rule 5—"Circumspect advertising may be properly employed by the engineer to announce his practice and availability. The form and manner of such advertising shall satisfy in all respects the dictate and intent of the Canons. Only those media shall be used as are necessary to reach directly an interested and potential client or employer, and such media shall in themselves be dignified, reputable and characteristically free of any factor or circumstance that would bring disrepute to the profession or to the professional using them. The substance of such advertising shall be limited to fact and shall contain no statement or offer intended to discredit or displace another engineer, either specifically or by implication."

Discussion:

Whether issued by the firm itself, or on its behalf by a public relations firm, the press release is advertising in the sense that its purpose is to make known to other persons the engagement of the firm, with the resulting inference that the dissemination of such knowledge may generate additional engagements.

As indicated in Case 59-1, advertising by an engineering firm is not prohibited, nor is the solicitation of professional engagements in a dignified and proper manner. It is necessary to review in detail each release to determine its acceptability under the existing Canons and Rules.

Exhibit A is approved as an example of an acceptable press release. The last paragraph was considered at length. The Board agrees that, assuming that all the statements are facts, this is not self-laudatory and does not compromise the dignity of the profession. However, it does represent the limit beyond which a more laudatory statement would not be acceptable.

Exhibit B is a typical example of an unsatisfactory and unacceptable release. Even assuming that the statements made are facts, the choice of language and the methods of expression make the release self-laudatory and undignified. For example, such expressions as, "we are investing 34 years of experience . . ." "massive programs . . ." and "spur development of quality building . . ." are flowery, promotional and undignified, and judged to be self-laudatory.

In addition to the above, the general tenor of the release is highly self-laudatory and implies that the firm can render a professional service not available from others.

We would add, as a general cautionary note, that consulting firms should insist upon review and clearance of the content of all press releases of the type discussed in this opinion. Such vigilance should preclude exaggerated, untrue, or misleading claims or statements which otherwise might result from the zeal of the public relations firm to serve the interests of its client.

Conclusion:

Exhibit A is a typical example of an acceptable press release.

Exhibit B is unsatisfactory and violates both Section 2 of the Canons and Rule 5.

"Press releases issued by a practicing engineer or with his consent are ethically proper and in accord with the Canons of Ethics and Rules of Professional Conduct, provided such releases meet all the criteria set out in the Canons of Ethics and Rules of Professional Conduct. They must be limited to statements of fact, must not contain self-laudatory statements, and must not be worded so as to cast reflections on the qualifications of any other engineer."

Engineering Valuation Of H&M Authorized

Exhibit A

On petition by Herman T. Stichman, trustee, Federal Judge Archie O. Dawson authorized on December 29 the retention of the New York engineering and management consultant firm of Doe and Roe, for a study of the present-day value of the railroad properties and business of the bankrupt Hudson & Manhattan Railroad Company.

The H&M operates the Hudson Rapid Tubes commuter line between Hoboken and Jersey City, N. J., and New York; jointly with the Pennsylvania Railroad it operates a similar service between

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Protection of Public Rates First . . .

What Is the Real Meaning of Engineers' Registration?

Mr. Constance

By

JOHN D. CONSTANCE, P.E.

Engineering Registration Consultant

ENGINEERS' registration has gone far beyond theory . . . it is an established fact, and it is here to stay and grow. The present status of engineers' registration is the result of years of hard work by the pioneers of this movement. Because these pioneers had the vision, conviction and strong belief that it represented an indispensable forward step in progress of the profession, because their efforts overcame complacency and continuing disparagement, prejudice and misunderstanding, secret opposition and even open antagonism, engineers' registration has been made law in every state and territorial possession enacting statutes governing the pratticing of engineering by individuals.

What were the strides this great movement made in its challenging development from the beginning of the passage of the first registration law in Wyoming in 1907 to the present day? Some thirty years ago, the number of registered professional engineers was comparatively small—a mere 10,000 in 1930. Today, we have over 240,000 and the number is increasing rapidly at the present rate of 15,000 each year. There are many forces afoot to strengthen licensing procedures and many boards of examiners are streamlining their own procedures. And as more and more engineers become aware of the long-range benefits to their profession and themselves, and as more and more engineers learn to obtain licensure, the practice will become more widespread.

We must look at engineers' registration from the long-range point of view in matters of *service to the public, acceptance by the public,* and *ultimate recognition by the public.* Only thus can the public respect for the engineering profession be increased.

Registration of engineers is primarily for the protection of the public and the public must be the first consideration of the practicing engineer whether as a consulting engineer, or an employee of a manufacturing corporation, or an engineer in the employ of the Federal or state governments. The profession and the individuals in it must rank second. Responsibility to the public, which is implicit in our state registration laws, is focusing the attention of the practicing engineer on his profession, and a further effect is to bind more closely all technical branches of engineering through these common requirements. Thus, to the public view, the engineering profession can present one common front, one profession.

The public is interested in protecting itself from the incompetent and those unprincipled individuals

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John D. Constance, who has been helping prepare engineers for license examinations for the past seventeen years, writes about the importance of engineers' registration from personal experience. He is associated with the refresher course work of the ASME, AIEE, AIChE, and ASCE in New York City; has contributed to the preparatory program of the U. S. Army Engineers School at Fort Belvoir, Virginia, and conducted courses of preparation for licensure at Fort Monmouth for the U. S. Signal Corps, and Westinghouse. Mr. Constance is licensed in the States of New York and New Jersey and holds a Certificate of Qualification from the National Bureau of Engineering Registration. He has recently written a book entitled, How To Become a Professional Engineer *published by the McGraw-Hill Book Company in New York City.*

who seek licensure to prey upon it in the name of engineering. It wants dependable engineers who can pass minimum requirements for licensure. The public is not particularly concerned about providing a better way of life for the engineer, except as the public interest is served. However, it generally follows that any good passes along to the public is passed along to the engineer, and vice versa.

Practically every design, every operation, and every process developed by engineers has public implications. If the engineer designs a bridge, develops a new instrument, constructs a steam or gas turbine, or designs an intricate control system, he must always have the safety and well-being of the ultimate consumer—the public—uppermost in his mind. It should be evident that engineering, because of these implications, *must be regulated by the state*—and must come under the police powers of the various states—to provide this protection to the public. Were the health and safety arguments not true, registration laws would not have been adopted by any of the legislatures in any of the states.

A real movement is underway to make uniform the definitions of competency and to adopt a common nomenclature for licensing. The various technical societies are considering amendments to their fundamental laws to obtain uniform grades of membership so that "engineer member" will have the same significance as "engineer registrant." Surely this is a strong step toward professional unity and professional consciousness. But unity has been found to be of an elusive quality.

Registration will not be handed to you on a silver platter. You will have to do something about it. You will find as have the many who have preceded you that it will be well worth your while not to let opportunity slip by you. When you have received your certificate attesting to the fact that you are a professional engineer you may take justifiable pride in a real accomplishment. You will have earned your Badge of Competence and you will be proud to display it as evidence of your membership in a great and learned profession.

—"Next Step—Registration," NSPE publication for graduating engineers.

THERE has been a tendency to break up into specialized groups because of community of interest. And there are many other reasons for its continuation. To counteract this tendency, those who have been concerned with licensing have superimposed an effort to get unity. While specialized group action seems to be the trend, acting in unison is the ultimate goal and one which needs constant attention. Recognition must come before unity; the former must be achieved before the latter can be realized.

All registered engineers have similar qualifications and some common objectives. The very matter of the passage of registration laws has given a joint objective and has promoted larger and more active cooperation. Through the medium of registration laws, engineers have established the record that, in principle, engineering is one profession, though specialties may be many. In law and medicine there are many specialties, but lawyers and doctors would never consent to the legal subdivision of their professions. Fundamentally the engineer has the same common basic educational training and this condition is becoming more strongly implemented in our engineering colleges today. Whether a man writes Chem.E., C.E., E.E., or M.E. after his name he has the same governing qualifications in the most professional sense His method of analytical approach to problems of a technical nature, ideals of professional status, interest in the profession's standing and reputation all have a common basis in his way of thinking.

One way that regulation of the practice of engineering is achieved is by protecting the use of the title, "engineer." This method has been declared constitutional by our state courts and is being enforced by our state boards of examiners, the National Society of Professional Engineers and its various state societies and chapters at the grass root level. Without registration laws there would be no legal way to stop the "practice" of engineering by non-engineers. Vigorous effort is being made to stop the abuse of the designation "engineer." Requirements of experience and examination are being strengthened by our state boards. The trend today is to register not only the principals but, in addition, all engineering employees of firms engaged in works of an engineering nature, where the health, life, safety and social well-being of the general public are involved.

"To the officer in the Corps of Engineers professional competence means being both a soldier and an engineer. As to maintaining technical engineering proficiency in this dynamic world, I know of no better way than participating in professional societies and obtaining any professional licenses for which you may be qualified."

—Major General E. C. Itschner, Chief, U. S. Army Corps of Engineers

Many believe that the professional status of the engineer in our society is in transition. Certain of these forces of transition causing the change stem from the activities of the various state boards, but it appears to be that the greatest force is due to the changing position of technology in our society. Dr. L. M. K. Boelter of the California State Board of Registration for Civil and Professional Engineers has said, "An important question which arises from these forces of change is the following: what are the minimum standards of knowledge and performance which will protect the public health and safety in this age of great technological change?"

Without our registration laws, the engineer would have been restricted in his established rights to practice his profession. One of our pioneers of the registration movement points out that, in the early days, legislation sponsored by architects would have eliminated or subordinated the engineer in the structural field. In states where architects promoted and legislators

passed registration laws before similar laws were passed for engineers, there was real difficulty for the structural engineer. He had to work as an employee of the architect before he could design many kinds of structures.

The same pioneer goes on to say that it is a "matter of record" that physicians endeavored to monopolize the sanitary field, and that accountants sought to exclude others from making financial reports. The pioneers of the registration movement fought off legislation proposed by lawyers to deprive engineers of the right to prepare contract documents and to engage in arbitration proceedings. Even real estate brokers endeavored to monopolize the right of engineers to make appraisals. If the several professions are legally recognized, their licensed members may continue to perform the functions normally performed by such professionals. However, if the profession does not have legal status, it is possible for the offended profession to stop members of the offending group from performing tasks in the legalized areas.

Naturally, the esteem and prestige many outstanding engineers bring to the engineering profession attract many persons. Some of these persons are qualified and some of them are not, but they insist on wanting to use the title of professional engineer. Though these persons may be good citizens and neighbors, many are not in possession of adequate technical knowledge.

WHAT does a professional engineer's license mean to the man in matters of technical development? There is no doubt that some engineers with P. E.'s are substandard, but there is definite proof from contact with engineers that the development of the individual engineer is being improved technically. The influence of engineers' registration, and the need to meet its requirements, inaugurated programs of accrediting engineering schools and colleges. This has raised standards of engineering education in such matters as improved curricula, quality of teaching, educational plant, and equipment.

"Inasmuch as our organization is primarily an engineering organization, it is incumbent on our engineering staff to advance both their professional knowledge and their professional status in every proper manner, and one of the most important steps in this direction is qualifying under existing laws as a professional engineer.

"Professional engineer registration is covered by law in every State and it is becoming more and more necessary to have such recognition in order to qualify as a professional man. In addition, all of us have an obligation to support efforts to clarify the status of engineers for the protection that affords the public."

—President Merwin M. Brandon, P.E., Underwriters' Laboratories

Long before engineers' registration, most engineers were so-called "self-made" men. They learned to do their jobs through the school of hard knocks and experience—and good engineers many of them became. Even to this day we often hear engineers of the old school belittle a formal technical education. However, with changing times and through the effective instrumentality of registration, professional education, graduate study and advanced degrees have now become the rule. Nevertheless, the door to registration has not been barred to the man who has not had the advantages of a formal engineering education. He is provided with the same opportunity by his board of examiners as an engineering graduate to become registered by taking the same written examination.

Registration creates a definite recognition of the professional status of engineering. Registration does not organize for anything, but it does have a tendency to make engineers think of themselves as a unified group. Although registration does not classify a man as to his ability to do his job it has introduced a minimum standard. Engineers' registration should be looked upon as a point of beginning in a man's career and not the end point. This standard assures that the practicing engineer is qualified in the eyes of the law, giving him legal status, and providing him with the right to make available his services to the public.

A number of court cases show that a contract to do engineering work is not a legal contract unless the participating engineer is registered. Thus, a fee cannot be legally collected.

Because registration enhances recognition many industrial organizations are presently encouraging their engineers to become licensed.

More and more people are thinking in terms of engineers' registration and what effect it may have on the general practice of engineering. At this time about one-half of those who consider themselves to be engineers have done something about it and have obtained licensure. While there is a strong trend for the younger members of the profession to take necessary legal steps, many of the older ones are reluctant to do so. This latter position is becoming more untenable with the passing of time. Under the banner of protection of the public, the basic function of engineering is being propounded as the responsibility of the individual—no matter in what employment. This is a prelude to an impending situation whereby all engineering practice, either by employed or self-employed, must be carried on by those who have the legal status as professional engineers.

Although the Constitution protects the right of individuals to work and is so protected by our courts, lack of registration may prevent further advancement for many engineers who otherwise could look forward to promising careers. This becomes a very important personal matter, indeed. It behooves the engineer to look up from his preoccupations and to do something about it.

The general theme is that engineers' registration is necessary for the welfare, safety, and well-being of the public with its manifestations taking on any form to fulfill this important obligation.—**End.**

New Literature

STEEL SPRINGS—A completely new 6-page catalog giving all the latest data on stopping vibration, shock and noise transmission by using steel spring machinery mountings has been published by The Korfund Company, Inc. Bulletin K3C explains clearly the superiority of steel springs in controlling vibration and shock, and describes the Korfund Series "L" Vibro-Insolator, a standard, catalog unit. A series of eight typical case histories, complete with actual installation photos, describe how spring machinery mounts solved a representative range of vibration problems. Easy-to-read data tables giving capacities and characteristics of the Series "L" Vibro-Insolator are furnished, including insolator sizes, load capacities, dimensions, and shipping weights. Bulletin K3C also describes the many variations available in Korfund mountings to meet a variety of difficult operating conditions. A feature of the catalog are ten drawings of typical installation arrangements which cover almost all installation problems commonly encountered.

(Circle 15 in Readers' Service Dept.)

TIMERS—Engineers in search of timers for a particular application may select from a complete product line displayed in the new Condensed Catalog D-31 available from Automatic Timing & Controls, Inc. A convenient reference for automation components and control systems, this 30-page, 2-color publication covers latest timing components and linear measuring systems for industrial and military users. Standard timers and counters are completely reviewed. Specs and characteristics are listed. Special sections are devoted to electronic timers, special timers and their applications, package control systems, military components and systems and in one grouping, test equipment, switches, controllers, contactors and valves. Also treated separately are differential transformers, motion transmitters, edge guide, pressure transmitters, demodulators and indicators and recorders.

(Circle 16 in Readers' Service Dept.)

FIBERS—"Fiberglas Textile Fiber Materials For Industry," a 52-page illustrated booklet which is claimed to be the most complete compilation of technical data on the subject yet assembled,

has been published by Owens-Corning Fiberglas Corporation. The booklet is designed to show the wide range of industrial applications in which Fiberglas materials made from the continuous filament and staple fiber textile materials, cordage and sewing thread, scrim, mat, roving, chopped strands, milled fibers, fabrics and tapes, and standard packages for Fiberglas textile fiber materials. Other features of the booklet include an explanation of how Fiberglas is made, a textile fiber comparison chart, and a section describing the fabrication of Fiberglas textile fiber materials.

(Circle 17 in Readers' Service Dept.)

SERVICES—Dravo Corporation has just published a 12-page brochure illustrating many of the diversified projects the Pittsburgh company has handled for U. S. Government departments, and outlining its facilities for products and services in the fields of construction, shipbuilding, and metal fabrication. The brochure—"Products and Services for United States Government Departments"—points out that Dravo's experience in performing Government contracts and subcontracts extends over more than half a century. From underground missile launching silos at Cape Canaveral, Florida, to special purpose space heaters in DEW-line radar shelters in the Arctic, Dravo's products and services range over a broad area, the brochure points out.

(Circle 18 in Readers' Service Dept.)

CORROSION—A bibliography of literature prepared by chemists and engineers on the staff of Water Service Laboratories, Inc., is available. The 8-page booklet lists and briefly describes forty articles and technical papers dealing with corrosion, scale and other problems of water-using equipment. The list of material, of interest to managers of large buildings, including apartment houses, office buildings, institutions and other commercial and industrial structures, is divided into three major categories: (1) Treatment of Domestic Water; (2) Treatment of Boiler Water, and (3) Treatment of Air-Conditioning circulating water. Most of the material listed is published in the form of maintenance hints or technical bulletins. Some of the articles are reprints of papers written by staff members of Water Service Laboratories which appeared in trade and technical journals.

(Circle 19 in Readers' Service Dept.)

THERMAL INSULATION—"Rethinking Thermal Insulation," a new booklet, is a guide to the best use of thermal insulating materials under the changing conditions of modern industry. It emphasizes the "economic thickness" approach to specification, which enables management and engineers to determine the point at which insulation gives the greatest financial return for its cost, considering both operating and capital savings. Publisher of the booklet is the National Insulation Manufacturers Association, an organization of leading manufacturers of all types of inorganic insulations. Dollar savings through reduction of heat loss, process control, condensation prevention, and protection of personnel and equipment are given as the four main functions of insulation. Detailed descriptions and characteristics of types of insulation are given. The question of when surface temperature should determine insulation thickness is reviewed. The booklet also contains an index to ASTM and government specifications, as well as a section on "Economic Thickness—How to Figure It." A worksheet on economic thickness is included.

(Circle 20 in Readers' Service Dept.)

HEATING—Design data, control arrangements and economic advantages of heating high-bay buildings with Perfection-Schwank gas fired infra-red heaters are explained in a new four page, 2-color brochure offered by Hupp Corporation's Perfection Division. Claimed advantages of infra-red heat with its ability to heat the occupants and machinery in a building directly rather than the air itself are described in detail in the brochure. Tables of mounting heights for the different models and recommended minimum clearances from combustibles are given. Control arrangements for different types of gas, manufactured mixed or natural, are explained and keyed drawings are also included.

(Circle 21 in Readers' Service Dept.)

MOTORS—Alternating current motors designed and manufactured to meet the exacting requirements of government specifications for aircraft and missiles are described in a catalog published by the Electro-Mechanical Division of Lear, Incorporated. These motors, designed for specific application on electro-mechanical linear and rotary actuators, servos, pumps and valves, have been qualified to the most recent MIL specifications. The catalog presents information on horsepower, torque, speed, duty cycle, weight and size.

(Circle 22 in Readers' Service Dept.)

MODELS—A 40-page catalog "Mathematical Models for Teaching" illustrates hundreds of three-dimensional clear plastic models in Guenter Herrmann line now being distributed in the United States by Arthur S. LaPine and Company. These transparent models enable students to see not only the external shape, but also concealed edges, enclosed intersecting planes, and internal dimensions. Colors are used to identify hidden edges, intersecting surfaces, penetrating solids, and other features of special interest. In many models certain edges and surfaces are darkened for emphasis. Certain models are scaled for numerical measurements. Others use a numerical approach to demonstrate the truth of a theorem.

(Circle 23 in Readers' Service Dept.)

BUILDING PRODUCTS—The first edition of the AIA Building Products Register has just been released, and a descriptive brochure on the publication is now available. The 1960 Building Products Register, designed to assist architects, engineers and builders in comparing technical data and standards of related products, is a compilation of over 1,300 individual product listings in eighteen major categories, as well as nearly 700 abstracts of technical standards and specifications. The listings, organized by product types, include factual data on recommended uses, availability, physical characteristics, manufacturer's guarantee, technical standards, product literature references, and other information. The Register facilitates use of product literature and lists product specifications and properties as supplied by the manufacturer.

(Circle 24 in Readers' Service Dept.)

RIGID CONDUIT—A brochure describing the new aluminum rigid conduit fabricated by Harvey Aluminum has been published by the company. The publication outlines the claimed advantages of aluminum rigid conduit and specifies the dimensions and weights fabricated. Recommended installation procedures also are defined. The firm manufactures a complete range of standard trade sizes of aluminum rigid conduit, elbows, and couplings, including five and six inch sizes. A producer of primary aluminum and wrought mill products, Harvey Aluminum is marketing its rigid conduit through regularly established electrical supply distributors.

(Circle 25 in Readers' Service Dept.)

RAILINGS—Welded and fitted railings is the subject of a new brochure by Tubular Products, Inc. The catalog provides the basic data needed for design and specification of welded or fitted railings in steel or aluminum, in round or special shapes, for industrial, commerical, safety and ornamental uses. Only the more commonly used sections and materials are covered.

(Circle 26 in Readers' Service Dept.)

MOLDED PARTS—"Designing High-Impact Phenolic Molded Parts," the subject of a recently published technical article, has been issued as a 4-page editorial reprint by the Durez Plastics Division of Hooker Chemical Corporation. Written by Minert E. Hull, supervisor of molding research and development for Durez, the illustrated reprint presents 12 new design rules for minimum cost, all based on latest industrial experience with fiberglass-reinforced phenolic resens. Also included are tables covering shrinkage limits for high-impact phenolics, comparison of mechanical properties of phenolic and polyester resins, and minimum wall thickness around inserts.

(Circle 27 in Readers' Service Dept.)

TEST RESULTS—Results of 18-month corrosion tests, comparing wrought iron and steel on racks at two major block plants, are presented in a new 12-page booklet, "Corrosion—Resisting Concrete Block Racks," now available from A. M. Byers Company. Another feature is a discussion of how block producers can eliminate premature block rack failures through proper material selection and rack design. Actual working drawings and bills of materials for six standard rack designs are reproduced in the booklet, along with a suggested wheel assembly.

(Circle 28 in Readers' Service Dept.)

MAGNET WIRES—A 50-page catalog covering General Electric's complete line of magnet wires has just been issued by the company's Wire and Cable Department. The catalog includes full product descriptions with dimensional data and application information. A feature of the catalog is a specially prepared guide designed to give the design engineer a quick method of making preliminary selection of wires according to insulation and other requirements. It covers such types of wire as Formex, Alkenex, polyurethane, cotton, nylon, Teflon, glass fiber, Dacron glass, asbestos, self-bonding, solderable, and others which are combinations of these insulations.

(Circle 29 in Readers' Service Dept.)

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims. To receive any of the new literature described in these columns, merely circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

Final Two States Affiliate At NSPE Meeting in Boston

- Society Broadens Professional Program
- Four-Day Session Has Many Highlights

NSPE met in its twenty-sixth annual session in Boston last month on a keynote of Society expansion and a broadening program of professional activity.

The four-day meeting opening on a high note with the admission of two new state societies—New Hampshire and Kentucky. Admission of the two groups brought to realization the Society's long-sought goal of representation in all fifty states plus Puerto Rico, the Canal Zone, and the District of Columbia.

In addition there were these major highlights during the four days:

- Board approval of the establishment of an Institute for the Certification of Engineering Technicians.
- Steps toward implementation of the Functional Plan for unity of the engineering profession.
- A preliminary report on the PECBI's new survey "Engineering Professionalism in Industry."
- Approval of an expanded program of public relations.
- Presentation of the NSPE award to James F. Fairman, senior vice president of Consolidated Edison Company of New York; and the first annual Industrial Professional Development Award to the Phillips Petroleum Company.
- Adoption of a proposed political platform plank calling on the Democratic and Republican Parties to "recognize the role of engineering."

The institute for the certification of engineering technicians will be exclusively an examining body and will be operated by a board of directors comprised of an equal number of registered professional engineers and certified engineering technologists.

A. C. Friel, P. E., chairman of the Committee on Engineering Technicians, told the Board that the institute "should provide a much-needed means of recognizing the status of technician members of the technological team." Mr. Friel said he believed the institute would also lead to the upgrading of education and work experience as well as the continued self-development of the technician.

Essentially the institute will be designed to:

(1) Determine by examination, endorsement or otherwise the qualifications of all persons who apply for certification.

(2) Grant a certificate in the appropriate grade to applicants who successfully meet the criteria for certification.

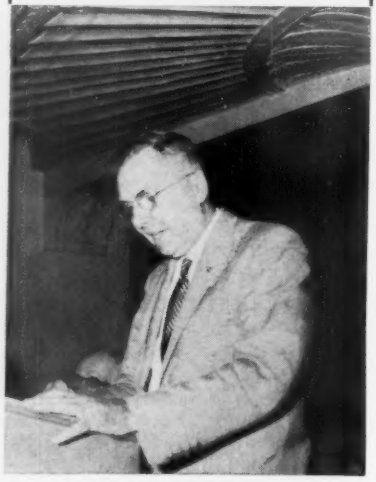
The Board got an unexpected boost for the NSPE-endorsed Functional Plan when William Ryan, former president of ASME, and Harold Foote, president of AIEE, announced that their organizations had taken action towards starting negotiations with NSPE for implementation of the Plan. Both men attended the meeting as official observers for the two engineering organizations. ASME, AIEE, and NSPE have endorsed the Functional Plan for organization of the profession.

Shortly after the appearance of the AIEE and ASME representatives, the Board adopted a recommendation of the Inter-Society Relations Committee reiterating NSPE's endorsement of the Functional Plan and directed the Committee to work "in full cooperation with the engineering groups which elect to participate in a program for implementation of the Functional Plan."

Earlier in the session, the Board approved a report from the Education Committee recommending that ECPD take the leadership in coordinating the work of the education committees in NSPE, the various Founder Societies, and IRE. This recommendation follows along the lines of the Functional Plan which would assign ECPD the duties of coordinating the educational activities of the engineering profession.

Other action saw the Board approve the Public Relations Commitee's recommendations for an expanded P.R. program. Keystone of the enlarged effort will be the production of a thirty-minute film on professionalism. Distribution of the film will be handled through state societies and engineering school deans with the assistance of local chapters. The committee's recommendations also call for the

Dr. Dryden . . .



Dr. Hugh L. Dryden, deputy administrator of the National Aeronautics and Space Administration, as he spoke to a luncheon gathering at the annual NSPE meeting. Dr. Dryden told the group that engineers, "are only too rarely" credited with the achievements of recent times.

Admiral Burke . . .

Admiral Arleigh Burke called on engineers to help the nation meet its responsibilities. "Freedom goes only to those who choose it, earn it and work for it," the Admiral said.

addition of one member to the public relations staff in Washington.

The Board adopted a proposed platform plank for both political parties calling on the parties to recognize the contributions of engineering to the advancement of national goals. The plank, drafted by the Policy Review Committee, reads:

"With our national life and progress dependent, in a large measure, upon advancement in engineering and science, it is of the utmost necessity that all necessary steps be taken to provide a favorable climate for:

"(a) Adequacy in numbers and qualifications of engineers and scientists, and

"(b) Understanding of proper utilization of these engineers and scientists.

"In providing this climate for professional participation at the highest level, we shall confer with the professions and promote programs for the following purposes:

"Encouragement to our educational institutions in the training of the required number of engineers and scientists, with special emphasis on quality through postgraduate study.

"Development of a professional career schedule and programs to permit the Federal Government to attract and retain the engineers and scientists urgently required for existing and future activities of a technical nature.

"Full utilization of engineers and scientists for professional pursuits, with adequate supporting personnel. Qualified engineers and scientists should be employed at the policy-making level for direction of programs basically technical in content and substance.

"Effective utilization of the national engineering and scientific talent by the active participation of those in private practice under contracts negotiated at fair fees on a noncompetitive basis.

"Legislation to provide engineers and scientists with fair and nondiscriminatory status under Federal laws, such as a self-employed retirement fund, separate identification and voting rights under the labor laws and recognition of legal status through state registration laws.

"We propose to call upon the professional engineers and scientists of the nation for their guidance and maximum contribution to the national welfare in the critical period ahead, with the knowledge that as professional men and women their primary dedication is to the public welfare."

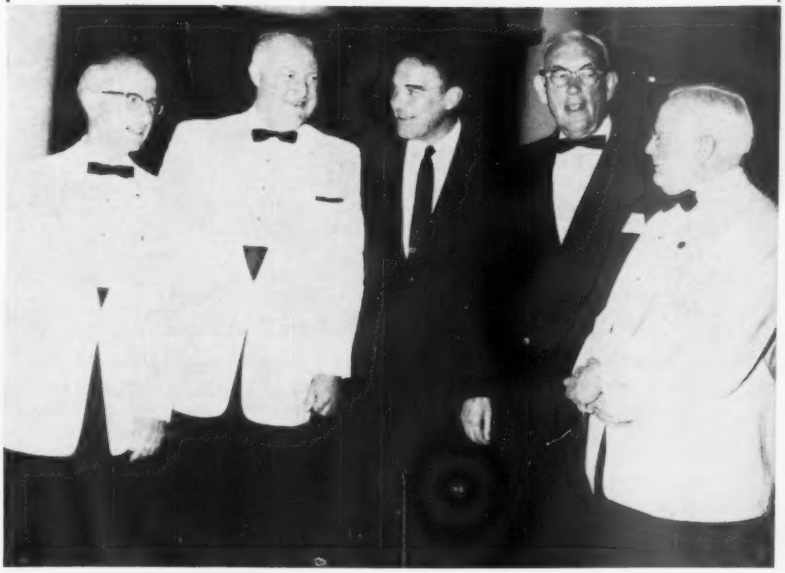
At least two of the speakers at the luncheon sessions of the meeting also touched on the need for greater national recognition for the achievements of engineering.

Dr. Gordon S. Brown, dean of the College of Engineering at MIT, pointed to the dropping engineering enrollments as evidence that the profession was not being held in high esteem by enough of the bright young minds of the nation.

He said the profession needed to attract into its ranks the bright uncommitted high school graduates and provide them with an engineering education that will equip them with "the versatility of mind that will enable them to work at the frontiers of the technologies."

Dr. Brown noted that much of today's emphasis was on the scientist. "If a satellite goes into a beautiful orbit everyone says 'what a wonderful scientific achievement;' but if it fizzles they ask 'what went wrong with the engineering.'

Founder Societies Represented



The Founder Societies were well represented at all sessions of the four-day meeting. From, l-r., are; J. H. Foote, president of AIEE; Garvin Dyer, past NSPE president and chairman of the Inter-Society Relations Committee; Will Mitchell, Jr., official observer for AIME; Frank Marston, president of ASCE, and William Ryan, former president of ASME and an official observer for that society at the NSPE meeting.

"We should be ready to boldly assert that it is the engineer who is bringing about the revolution in technology . . . it is he who is bringing about the potential for a world without want."

Dr. Hugh L. Dryden, deputy administrator for the National Aeronautics and Space Administration, followed up the next day with a similar appraisal.

"There are few groups in our nation whose work is so much taken for granted and so little understood by the public," Dr. Dryden told a luncheon gathering. "Engineers are only too rarely associated in the press with the great accomplishments of recent times.

"Engineers have an immense task of public education . . . we must bring before the public the great engineers of our day as persons identified with their creative works and the contributions of these works to human welfare," Dr. Dryden said.

On the closing night of the four-day session, Senator Kenneth B. Keating of New York called on engineers to play a major role in helping the nation to cope with the problems of expanding urbanization.

He suggested the establishment of a Cabinet-level Department of Urbiculture to develop " a fresh creative attitude about the kind of city planning that responds to the needs of the times.

"In close cooperation with state and local governments," he said, "the department could develop national programs for combating smog, slums, and traffic snarls just as the Department of Agriculture has developed programs to combat drought, soil erosion and depressed farm income."

He said such a program was a "special challenge" for engineers and told the group that good government was best possible when it

(Continued on page 44)

NSPE Board of Directors, 1960-61

Members of the 1960-61 NSPE Board of Directors are, 1st row, l-to-r: Phillips, Colorado; Gordon, Washington; Miller, Georgia; Friel, Michigan; Treasurer Allen; Past President Dyer; Vice President Christian; Vice President Easley; Vice President Hull; President Mosher; Vice President Backlund; Vice President Rouse; Vice President Zelhart; Exec. Director Robbins; Johnson, California; Hudson, Alabama; Ferry, Missouri; 2nd row, l-to-r: Bashaw, Mass; Eaton, Maryland; Reynolds, Idaho; Adams, Mass; Hescheles, New York; Nelson, Pennsylvania; Johnson, New York; Irvine, Utah; Edwards, Illinois; Hanes, Ohio; Bierman, Canal Zone; Simrall, Mississippi; Amstutz, Illinois; Mann, Tennessee; Missman, Illinois; Cottingham, Wisconsin; Benford, Rhode Island; Hill, Oregon; Veigel, North Dakota; Myers, Pennsylvania; 3rd row, l-to-r: Mann, New Mexico; Baty, Ohio; Trefry, Michigan; Smith, Delaware; Genovese, Connecticut; Schultz, South Dakota; Nicholson, Pennsylvania; Murati, Puerto Rico; Kirkwood, Missouri; Durlach, South Carolina; Bouson, Pennsylvania; Morris, D.C.; St. John, New York; Gilbert, Nebraska; Wilson, Hawaii; Cooper, Texas; Jacobs, Alaska; Watkins, Kentucky; Bissett, Arkansas; Westerhoff, New Jersey, and 4th row, l-to-r: Hutton, Indiana; Martin, Maine; Jansson, Louisiana; Olson, Minnesota; Newell, New Hampshire; Childs, New Jersey; Haulenbeek, New Jersey; Harris, Texas; Bransford, Florida; Thompson, Texas; Stufflebean, Arizona; Schemm, Missouri; Von Voigtlander, Michigan; Wegner, Iowa; Estergreen, Indiana; Honefenger, Missouri; Morse, Kansas; Ellis, Wisconsin; Boynton, Virginia.

Fairman Receives Annual Award

James F. Fairman, senior vice president of Consolidated Edison Company of New York, became the tenth winner of the NSPE annual award for "outstanding service to the engineering profession."

NSPE Award

Harold A. Mosher, left, outgoing NSPE president, presents the annual NSPE Award to James F. Fairman, senior vice president of Consolidated Edison Company of New York.

Mr. Fairman, a former president of the NYSSPE, received the award from Harold Mosher, outgoing NSPE president, at the banquet closing the Society's twenty-sixth meeting in Boston.

The engraved plaque read: "In recognition of outstanding performance and originality in utility system design and operation; responsible citizenship in National Defense; pioneering leadership in the development of nuclear energy for peaceful purposes and continued initiative in the advancement of the engineering profession."

After accepting the award, Mr. Fairman urged his fellow engineers to help establish and maintain high standards for the engineering profession. "It is very important that engineers take a more active role in helping engineering registration boards set up standards and to help maintain them." He suggested the possibility of every candidate for engineering registration having a professional engineer sponsor before the registration boards.

Mr. Fairman said there was a constant need for a supply of new recruits that haven't "learned yet that it can't be done. We must offer them challenges not security."

Mr. Fairman began his service with the Brooklyn Edison Company in 1925 as assistant outside plant engineer. During 1951 and 1952 he was on leave for government service as deputy administrator and administrator of the Defense Electric Power Administration. He was named senior vice president for Consolidated Edison in 1957. Mr. Fairman has been chairman of the Edison Electric Institute's Technical Appraisal Task Force on Nuclear Power and has served as chairman of the National Association of Manufacturers' Committee on Nuclear Energy. He is a member of the New York State Atomic Energy Advisory Committee and a vice president and director of the Atomic Industrial Forum. He has received the distinguished Service Award of the U. S. Department of the Interior, and the Edison Medal.

Plaque is Presented to Phillips

Phillips Petroleum Company, with more than 2,000 graduate engineers, received NSPE's first annual Industrial Professional Award at the Society's annual meeting.

The award, an engraved plaque, was presented to Paul Endacott, president of the Phillips Company.

The Bartlesville, Okla., company was selected by a five-member committee in recognition of its "outstanding advancement and improvement in the development and application of forward looking engineering employment practices."

In accepting the award, Mr. Endacott told the NSPE members that the responsibility for the reputation of a profession "can rest only upon the shoulders of its competent individuals. If a 'let George do it' attitude governs, the engine cannot hit on all cylinders and there is little or no progress.

"Professional excellence," Mr. Endacott reminded the group, "pays handsome dividends to every contributor. It furnishes the background of reputation for performance and integrity that engenders confidence and confidence is the cornerstone of all dealings."

Members of the Committee which selected Phillips Petroleum were Robert A. Blackburn, manager, strategic materials section, engineering and construction division, Koppers Company, Inc., chairman; Louis J. Larson, consulting engineer, Welding Industries Group, Allis Chalmers Company; Wayne E. Ault, manager, technical department, "Automatic" Sprinkler Corporation of America; George Stevens, general manager, Worthington Corporation, and R. F. Danner, vice president, research and development, Oklahoma Gas and Electric Company.

Industrial Award

Paul Endacott, left, president of the Phillips Petroleum Company, accepts the first annual Industrial Professional Development Award, from President Mosher.

Functional Section

Members of the Functional Section on Engineers in Private Practice listen intently to a speaker during one of the special sessions for the consultants.

MEETING

(Continued from page 42)

had "the constant preoccupation of men like yourselves."

In an address on the second night of the meeting, Admiral Arleigh Burke, chief of Naval Operations, also called on the engineers to help the nation meet its responsibilities.

". . . Freedom goes only to those who choose it, who earn it, who work for it . . . this is a continuing process and each generation must make its own choice and do its own work.

"Your theme 'Decade of Decision,' " Admiral Burke told the Society, "is appropriate and timely. It is not a surprising choice, however, because as engineers you are accustomed to making decisions. The wisdom of these decisions is reflected in the strength of our Navy, in the strength of all the Armed Forces and in the continuing progress of our wonderful country."

Engineers in Private Practice

Of the Functional Section for Engineers in Private Practice, highlight of the meeting were addresses by Gordon H. Scherer of Ohio, ranking Republican member of the House Roads Subcommittee, and Arthur W. Lewis, attorney for the New Jersey Society of Professional Engineers.

Rep. Scherer told an overflow audience of consultants that he would exert every effort to continue the use of consulting engineers in the Federal highway program. He warned, however, that "you are going to have an increasing demand for bigger and bigger engineering departments and for the elimination of private engineering services in government work," despite evidence that private enterprise engineering is more efficient and economical.

"We must insist that before any action is taken an unbiased study be made of highway construction engineering costs by both government agencies and by private engineering companies . . . in other words the Hoover Task Force Report made in 1955 must be brought up to date. I myself have no doubt as to the outcome of an impartial survey," he told the consultants.

Before Rep. Scherer spoke, the Section's Executive Committee had voted to conduct a "grass roots" campaign among members of Congress to acquaint members of Congress with the findings of the recent survey on the use of consultants on government projects. Meanwhile, members of the Functional Section plan to meet with key governmental agency leaders to discuss the report and sound out ways and means for consultants to improve their relations with the agencies.

Rep. Scherer . . .

Gordon Scherer, of Ohio, ranking Republican member of the House Roads Subcommittee, addresses a group of consultants at the annual meeting. He promised to exert every effort to continue the use of consultant engineers in the Federal highway program.

Mr. Lewis, attorney for the New Jersey Society in the McCamy case, reviewed the issues of architect-engineering jurisdiction, defending the right of professional engineers to design structures. Referring to the McCamy case he said that if the hearings "lead the professions and the legislature to a fair and understanding appreciation of the problem and a reasonably equitable solution the blood, sweat and dollars invested may prove to be of real benefit not only the parties and the professions but also to the public at large."

L. M. Van Doren of Topeka, Kans., was named chairman of the Section. Other members of the Executive Committee will be Alfred H. Samborn, Toledo, Ohio, immediate past chairman; and vice chairmen: P. W. Geneovese, New Haven, Conn.; George S. Rawlins, Charlotte, N. C.; Clyde E. Williams, South Bend, Ind.; Stanley A. Michael, Omaha, Neb.; Frank Newnam, Jr., Houston, Tex., and Earl C. Reynolds, Jr., Boise, Idaho and secretary, Herbert Manuccia, Alexandria, Va.

Engineers in Government

Highlight of the Functional Section's meeting was a panel discussion on the current status of the professional engineer in Federal, state and local government. Participating in the panel were Lt. Col. Stuart L. Davis, U. S. Air Force; Richard J. Healey, director, First U. S. Civil Service Region; William R. B. Froehlich, chief deputy secretary, Pennsylvania Department of Highways, and George G. Hyland, former commissioner of public works, Boston.

The NSPE Board of Directors approved a recommendation of the Functional Section and the NSPE Registration Committee putting the Society on record as being opposed to enactment of a bill which would create a system for the Federal registration of professional engineers, scientists and technicians. The measure, sponsored by Representative Foley of Maryland, would regulate the practice of engineering on Federal projects or projects sponsored by the Federal Government.

Wesley Gilbertson, chairman of

(Continued on page 46)

NSPE Has Nation-wide Affiliation As Kentucky, New Hampshire Join

With only a minimum of fanfare, the state societies of Kentucky and New Hampshire become official members of NSPE's far-flung family during the annual meeting.

The unanimous acceptance of the two new states gave NSPE affiliations in all fifty-three U. S. states and territories.

The action marked the final realization of a dream that has gradually come true as state after state affiliated with the national organization over the past twenty-six years. It was May 25, 1934, when representatives of state engineering societies in New York, New Jersey, Pennsylvania, and Connecticut met in New York City to launch NSPE with the hopes of expanding the organization into every state.

Every year since, the NSPE leadership has concentrated much of its efforts to making that 1934 hope a reality. Only last year Harold Mosher, as he took office for the 1959-1960 year, listed as one of his major goals the completion of the Society's representation in each state.

The Society moved one step towards that goal in October when representatives from the Vermont Society appeared at the Pittsburgh meeting to ask that state's affiliation. Then the full circle of fifty-three affiliated state societies was completed last month.

The Kentucky Engineering Society comes into the national fold with a membership of more than 1,300 members. The request from the Kentucky group was presented to the Board by its president, James L. Knight.

The New Hampshire Society, with more than 165 members, was represented by President Harold Langley.

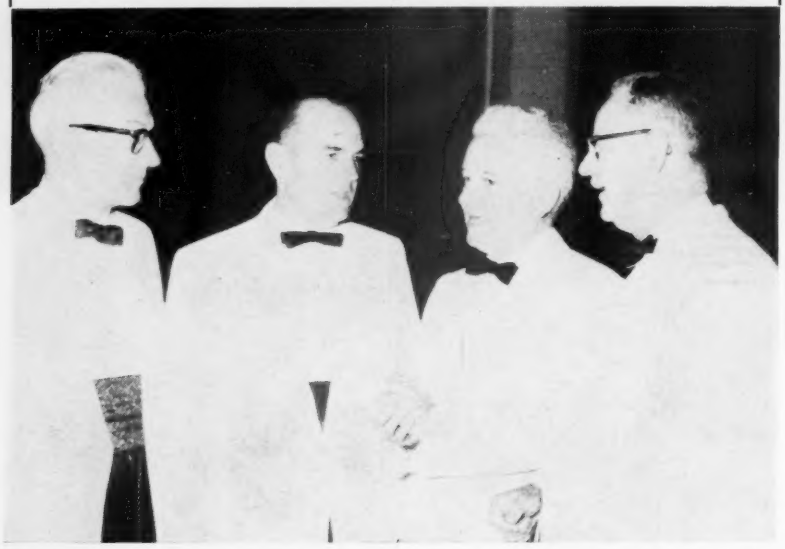
Henry Newell will serve as the first national director from New Hampshire. G. Reynolds Watkins and C. S. Crouse are Kentucky's two members of the national Board of Directors.

Officials of New Societies

VERMONT SOCIETY OF PROFESSIONAL ENGINEERS
KENTUCKY SOCIETY OF PROFESSIONAL ENGINEERS
NEW HAMPSHIRE SOCIETY OF PROFESSIONAL ENGINEERS

Officials of Kentucky and New Hampshire get together after their official affiliation with NSPE at the annual meeting. Shown, l-r., are: President Harold Langley, of the New Hampshire SPE; Henry Newell, national director for New Hampshire; G. Reynolds Watkins, national director for Kentucky, and James L. Knight, president of the Kentucky Society.

Senator Keating and Officials



Leaders of NSPE talk with Senator Kenneth Keating (R., N. Y.) at the annual meeting in Boston. Shown, l.-r., are: Noah Hull, 1960-61 president of NSPE; Harold Mosher, outgoing president; Senator Keating, and Benjamin Mills, general chairman of the Meeting Committee.

MEETING

(Continued from page 44)

the Functional Section, told the Board that the bill in its present form would seriously weaken state registration laws, would permit registration without examination of some persons of questionable qualifications, is vague in its ultimate application and provides a definition of "practice of engineering" which is excessively generalized.

Mr. Gilbertson was re-elected chairman of the section. Other officers are vice chairmen, Otto Mald, New York City; Ernest M. Titus, Knoxville, Tenn.; Melvin E. Amstutz, Libertyville, Ind.; Gordon E. Bodien, Minneapolis, Minn.; Leonard N. White, Little Rock, Ark., and William C. Hill, Salem, Oregon, and secretary, R. Emmit Welsh, Kansas City, Mo.

Brief summaries of some of the committee reports follow:

Board of Ethical Review

The Board of Ethical Review reported its findings on two new cases in the area of advertising-press releases and the application of the Canons of Ethics to subprofessional services performed by a professional engineer. The case on advertising-press releases appears on page 34. The second case will be published in the August issue of AMERICAN ENGINEER.

Dean Brown . . .

Dean Gordon S. Brown of Massachusetts Institute of Technology talks on engineering education to a luncheon meeting of NSPE at Boston.

Engineers-in-Industry Subcommittee

Chairman H. P. Cooper reported on a number of areas of current activity of the Subcommittee with special emphasis on the recently completed Western Electric Company Election. NSPE and the Engineers-in-Industry Subcommittee played active roles in the WE election which saw engineers reject 3,970 to 2,603 affiliation with an engineering union.

Student Professional Development Committee

Chairman J. Neils Thompson told the Board that plans were now being made for the assembling of student chapter kits for membership drives at the beginning of the next college long terms next fall. Mr. Thompson reported that four new chapters had affiliated with NSPE since the acceptance of the first chapter, the University of Pittsburgh, last fall. The new chapters are located at the University of Toledo, the University of Texas, Antioch College and Ohio University.

Nominating Committee

The nominating committee for 1960-1961 was announced. It will be composed of Clark A. Dunn, Oklahoma, chairman; C. V. Bonhag, New Jersey; Marcus Durlach, South Carolina; Alfred H. Samborn, Ohio; W. L. Hindermann, Minnesota, and C. C. Hallvik, Idaho.

Engineering Preparation

The Committee on Engineering Preparation, headed by Anatole Gruehr, recommended that its work be expanded by allowing additional funds for travel, personal contact and regional conferences between the leaders of the chapters which carry out major activities in high school education. The request was referred to the Budget Committee for consideration in preparation of the 1961 budget.

Education Committee

The Board, on recommendation of the Education Committee, adopted an ASEE resolution con-

(Continued on page 48)

Engineering Talent Misused Claims Recent PECBI Survey

Sixty-one per cent of the engineers employed in industry believe there is a considerable mal-utilization of engineering talent and more than one-fourth of them believe that engineers are regarded as "second class professionals."

These are some of the preliminary findings of a survey, "Engineering Professionalism in Industry," conducted by the Professional Engineers Conference Board for Industry in cooperation with NSPE. The results were released at the Society's annual meeting in Boston last month.

The survey was conducted by the Opinion Research Corporation on the basis of interviews with 209 engineers and forty engineering managers. The survey, which will be published in its final form soon, was designed to find out what engineers and managers mean by professionalism and how they think it can best be advanced.

The interviews brought out that ninety per cent of the managers questioned stated that they regarded engineers among the employees making the most valuable contribution to the company, but less than half of the engineers felt that they were so regarded by management.

Only one-fourth of the engineers stated that management tries to provide a creative atmosphere while nearly half of the managers claimed that management did try to provide such an atmosphere.

There was a similar disagreement over the question of whether management shows genuine respect for the engineers. Sixty-eight per cent of the managers indicated they believed management did show respect; but only thirty-six per cent of the engineers agreed.

The survey concluded that a lot of the problem in engineering professionalism "seems to be due to a lack of two-way communication between engineers and management."

The survey also found a considerable difference in professional attitudes between engineers in companies which would score high on efforts to encourage and develop high standards of engineering professionalism and engineers in those companies which would not score so high in such an evaluation.

Forty-four per cent of the engineers in the above-mentioned "high scoring" companies stated that management really believes in the professional status of engineers, while only seven per cent of the engineers in the second type of company agreed with this.

Fifty-three per cent of the engineers in the second type of company said that engineers are "sort of a commodity—let go quickly if business is poor," but only seventeen per cent of the engineers surveyed in the "high scoring" companies held this view.

Forty-nine per cent of the engineers in the "high scoring" companies admitted to considerable mal-utilization of engineers, but eighty-two per cent of the engineers in the second type of company said there was considerable mal-utilization.

The survey found widespread agreement in the "high scoring" type of companies that unions are incompatible with engineering professionalism. In the second type of companies, interviewers found more sentiment against than for engineering unions, but nowhere near the sentiment against such unions as was found in the "high scoring" companies.

to Remember

West Virginia Society of Professional Engineers—Annual Meeting, September 22-24, 1960, Greenbrier Hotel, White Sulphur Springs, West Virginia.

Virginia Society of Professional Engineers—Annual Meeting, October 14-15, 1960, Monticello Hotel, Charlottesville, Virginia.

Professional Engineers of Colorado—Annual Meeting, October 20-22, 1960, Statler-Hilton Hotel, Denver, Colorado.

Maine Society of Professional Engineers—Annual Meeting, November 12, 1960, Augusta, Maine.

National Society of Professional Engineers—Fall Meeting, October 19-21, 1960, Statler-Hilton Hotel, Denver, Colorado.

Board Holds Annual Meeting

Members of the Professional Engineers Conference Board for Industry listen to NSPE Executive Director Paul Robbins during the board's annual meeting. Preliminary findings of the PECBI's new report were released at the session.

Membership Award Winners

Winners of the annual membership awards pose with their banners. In the back row are l.-r.: Harold Mosher, outgoing president of NSPE; Arthur Gompf, national director from Maryland; J. Neils Thompson, director from Texas, and Tom Mann, chairman of the Membership Committee representing Montana. In the front row are l.-r: Earl Reynolds, national director from Idaho; W. C. Hill, director from Oregon, and N. O. Saulter, president of the Michigan Society.

Ladies Auxiliary Meets

Members of the Ladies Auxiliary also held important meetings at Boston. Presiding at the head table are, l-r.: Mrs. Hugh M. Nelson, president of the Pennsylvania Council of the Auxiliary; Mrs. Garvin Dyer, national chairman of the Ladies Auxiliary Advisory Committee; Mrs. Paul Otto of Springfield, Mass., one of the hostesses for the meeting, and Mrs. Benjamin Mills, chairman of ladies activities at the Boston meeting.

MEETING

(Continued from page 46)

cerning "Recruiting Practices and Procedures - 1959" prepared by ASEE. The resolution recommends to the deans and placement officers dealing with engineering students that they insist on the use of the ASEE statement on recruiting practices. The statement calls for the interviewer to "clearly explain to the Placement Office and students any special requirements such as the passing of tests, physical examinations, signing of patent agreements, or if his job is affected by any union contract."

Membership Committee

Winners of the annual Membership Contest were announced as Group I, Idaho, net gain of 183.7 per 1,000 prospects; Group II, Montana, net gain 167.4; Group III, Oregon, net gain 150.4; Group IV, Maryland, net gain 38.1; Group V, Michigan, net gain 36.2, and Group VI, Texas, net gain of 44 per 1,000 prospects.

State Society and Chapter Activities

Recommended and received authorization from the Board for the establishment of an annual program of recognition for the best large chapter, best small chapter and best state society. The Board also instructed the NSPE staff to develop a form for self-analysis for rating the chapters and state societies.

Ethical Practices Committee

The directors approved the addition of the following statement as Rule 18 under Section 8 of the Canons of Ethics:

"While in the employ of others, he will not enter into promotional efforts or negotiations for work or make arrangements for other employment as a principal or to practice in connection with a specific project for which he has gained particular and specialized knowledge without the consent of all interested parties."

Organization and Functions Committee

The Board approved the com-

mittee's recommendation that the Constitution and Bylaws Committee prepare the necessary changes to eliminate the Employment Practices Committee as a bylaws committee; the elimination and referral of the responsibilities of the subcommittee under this committee to the appropriate functional sections with the exception of the Engineer-in-Industry Subcommittee which would become a full bylaw committee.

Meeting Officials . . .

The Massachusetts Society of Professional Engineers with Walter J. Kreske as president, was the official host for the four-day meeting. Benjamin Mills, Jr., served as general chairman. Other committee chairmen included Walter J. Hickey, publicity; Louis B. McConaghy, finance and program; Mark M. Kiley, entertainment; William K. Cashin, registration; S. Blair Lent, hotel arrangements; H. E. Crabtree, meals; Louis A. Gray, exhibits, and Mrs. Benjamin Mills, Jr., ladies program.

Sacramento Chapter Sponsors P.E. Course

More than 100 new engineers have been participating in a program sponsored by the Sacramento Chapter of the California SPE to prepare them for an engineer-in-training examination to be given in August.

The course has created much enthusiasm and has given the Chapter a boost both financially and otherwise, according to L. D. Packard, president of the Sacramento group.

It was decided earlier this year that such a program aimed at assisting the participants to pass the exam for professional registration would not only benefit the Chapter, but the entire profession. Introductory memberships were offered to the new engineers.

Robert Keeling is chairman of the Education Committee which handled the details of the program. Members of the Chapter volunteered to serve as instructors for the sessions.

Thoughts on Professionalism. . .

By PAUL H. ROBBINS, P.E.
NSPE Executive Director

High School Engineering Clubs

In at least one section of the country there is open concern on the part of high school officials with the trend they feel is occurring in connection with science clubs and particularly science fairs. They are pointing out that the competitive aspects of the fairs are requiring an undue amount of students' time and that in many cases there is real question as to how much of the exhibits resulting are the work of the student.

What this hard look at science fair competition will produce by way of amended regulations is yet to be determined, but these very factors have been anticipated in the administration of at least one group of high school clubs receiving considerable assistance from NSPE chapters. The Junior Engineering Technical Society is a nation-wide organization of high school clubs. The JETS clubs have been growing at a rapid rate during the past few years as evidenced by the fact that they have increased from 223 clubs in 1957 to nearly three times that many in 1960. This organization has a headquarters staff, and while financed primarily from industrial grants, it also has received a National Science Foundation grant to develop and disseminate information sent to the clubs on a monthly basis regarding various projects which can demonstrate applications of science being taught at the high school level.

High school engineering clubs have an important role to play for the engineering profession. The normal associations of the high school student with science are with his basic courses in biology, chemistry, and physics and with the teachers of these subjects. It is not usual for the high school student to have any close association with engineers or with the practical applications of the basic sciences he is studying. This fact was a comment by deans of engineering when asked recently for the reasons which in their opinion have contributed to the decline in engineering enrollments during the last two years. The high school engineering clubs, and particularly the JETS clubs, provide this orientation; and it is interesting to note that eighty-eight per cent of the seniors enrolled in these clubs in 1958-1959 entered higher education. A vast majority of these students enrolled in curricula for engineering careers.

One of the requirements for recognition of a high school club by the JETS organization is that it must have some continuing sponsorship by an engineering group. A number of NSPE chapters are assisting JETS high school clubs on a continuing basis, and a number of others will be investigating the possibility of establishing such clubs in high schools in their area this fall.

NSPE chapters not now having a program in this direction could do well to investigate the possibilities of sponsorship of those young men who seem interested in engineering as a career so that the high school orientation may give them a feel of the applications of science.

Additional information regarding JETS programs can be secured either from NSPE headquarters or by writing directly to Junior Engineering Technical Society, Inc., P. O. Box 589, East Lansing, Michigan.

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WITH THE *Auxiliaries*

By Mrs. Garvin H. Dyer, Chairman of the Ladies Auxiliary Advisory Committee.

As the annual reports from the auxiliaries continue to come in, all the evidence is that the auxiliaries have experienced their most successful year. Memberships are up, as is attendance. There is a very large increase in interest and vari-

ety of projects. Several more new auxiliaries have been organized, and there are still more in the process of being organized.

The Queens Chapter of New York have organized an auxiliary with Mrs. J. H. Hughes elected as temporary president. It is hoped that enough chapter auxiliaries are organized in the State of New York to justify organizing a state auxiliary at the next annual meeting.

Fifteen wives of members of the Northeast Chapter of Alabama met and organized an auxiliary with Mrs. Harrison Rees as the president.

The auxiliary movement is growing rapidly in the far West with still another auxiliary organized. This one to the Southern Chapter of Nevada, the first auxiliary in that State. Mrs. Norman T. Hilbrecht was elected as the first president.

The Reading, Pa., Auxiliary had their first money making project, a card party and fashion show, which was a huge success financially and socially. From the profits, the Auxiliary presented the Reading Public Library $200 for the purchase of engineering books for the Engineering Shelf. The presentation was made during Engineers' Week, with pictures taken for publication in the local newspaper.

The Pittsburgh, Pa., Chapter Auxiliary held their Engineers Scholarship Benefit in April at the Churchill Country Club. A scholarship of $500 is presented annually, alternating between the University of Pittsburgh and Carnegie Institute of Technology.

The Bexar Auxiliary of Austin, Tex., have had their usual active year of sponsoring a co-op house for eighteen engineering students at Texas University. They held a lovely style show-tea at which they realized $504 to cover expenses of their activity of sponsoring the co-op house.

The Westmoreland, Pa., Auxiliary recently joined the men for a very interesting joint meeting. The program was "Repairing and Restoring Famous Paintings" by Dr. Feller from the Mellon Institute.

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EDUCATION

(Continued from page 30)

sense, then I would rather leave the future of education in local hands. Some may think of local school-board members as uninformed. But they are also parents. They are concerned with the future of their own children. You can count on their good intentions. I would far rather trust them than some self-seeking headline hunter who is ready to go off half-cocked on important matters of educational policy. Headline hunting cannot help education; but it can hurt it. So the arguments against localism do not strike me as being very cogent.

ANOTHER source of both strength and weakness is the slowness of American education to adapt. We educators like to criticize the schools for being so conservative that they resist the application of the fruits of research. It takes fifty years to get an answer to an educational problem and get it carried into general practice. The spread of these ideas is slow. This is bad. But it is also pretty good. When you think of the number of fads and pressures that are brought to bear on the schools and the amount of nonsense that is thrown around, it is a good thing that somebody holds the balance wheel.

It is a good thing that many teachers are career teachers, that they spend their lives doing it. They stay in that classroom; they watch these new ideas come in from outside and go in one door and out the other. If you work hard enough, you can sell almost any teacher on a new idea. You can get them to work on it just by pressuring them.

Then you go away. The teacher stays there. She tries this new thing this year. Next year she tries it again. She watches what happens. She will try it again the third year, maybe, if you have a really good idea. But, believe me, you have to have one whale of an idea to affect her teaching permanently, because she is testing it on a testing ground that you never reach; actual continued practice. If this new idea won't stand up over the years, it will not stand up at all. Conserva-

tism is built into the operation of the school, and that is a good thing.

Another strength of American education is revealed in comparing it with Russian education. Some persons apparently think that such comparison reveals our weakness. They say that Russians have better schools, that Russian children learn in ten years more than our children learn in twelve, and that, therefore, we ought to follow their pattern. This view is so wide of the mark as hardly to justify a discussion.

The fact is that the Soviet Ten-Year School has been under heavy assault within the Soviet Union. The depth and intensity of the criticism have clearly foreshadowed fundamental changes. The school has simply been out of contact with the needs of the Soviet society. Khrushchev himself has made a violent assault on it. The Presidium has adopted a law which abolishes these schools and sets up a new pattern of schooling. What you find emerging in the Soviet Union now is a mixture of academic study with work experience. I think that what will ultimately emerge will be pretty much like the American comprehensive high school.

The same forces are at work in England and France. They are at work in every society where the schools are similar to those we had in the nineteenth century, with one academic pattern for the elite and lesser schools for the rest. We found the hard way—by actual experience—that these schools put many of their pupils out of contact, and we needed an educational pattern which would get them into contact. Hence, the development of vocational education, of commercial courses, and of all kinds of things that are done in high schools along with the academic. Advanced academic work is suited to some percentage of the pupils, perhaps half. The needs of the other must be met, too. So the real lesson we learn from Soviet education is that American education is on the right track.

Implications for Policy

It is clear that if we are about to make wise decisions on educational policy, we must find some way to combine the knowledge of the pro-

(Please turn the page)

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fessional with the wishes of the citizen and the needs of the society. If we succeed in making a good combination, I think we would reach decisions along the following lines.

As for academic education, the wise course for the future in American education may well be better and more advanced academic experiences for a somewhat narrower spectrum within a single school. Far from raising the percentage of pupils who are involved in physics, I would lower it. Far from raising the percentage that takes foreign languages, I would make it a policy that no pupil should be permitted to study the second year of a foreign language who has not demonstrated both talent and determination in the first year. I would like to see advanced foreign language enrollments shrink down to that percentage that would really master a language. Where our academic resources are meager, as they are in the teaching of physics and foreign languages, it seems to me sensible to concentrate them at the points at which they will do the most good.

With reference to the control of education, I do not think that centralization would work, and certainly there is insufficient experience to prove that it would be wise. When I reflect on the ignorance or irresponsibility of many national political figures, of many national magazines, and of many other na-

About the Author . . .

Dr. Russell

Dr. James E. Russell is secretary of the Educational Policies Commission of the National Education Association and American Association of School Administrators. Before taking his present position he was professor of education at Teachers College, Columbia University, and in 1952 served as visiting professor of international relations at the nation's highest military college, The National War College, in Washington, D. C.

This AE article is an edited version of a recent talk given by Dr. Russell at the War College. The views expressed are those of the author.

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tionwide media of communication, I am thankful for educational localism. In the present state of our society, national issues tend to be presented in oversimplified form, and the decisions on these issues are influenced—even determined—by sensation mongering. This is no place for education.

As for basic philosophy, I think that we do need to change. I am not arguing against Dewey or repeating the nonsense that you read in some journals. I think that the individually oriented school, toward which we have been working, is essential. But I think, also, that the role of the public interest needs larger play.

Many things are done in a school. Some of the things we do for children we do in their own interest; other things we do because the society needs to have them done. I should like to see a little more stress on this second side. I think that the concept of the public interest would illuminate a lot of the curriculum debates that now go on.

I think also that we need to give greater stress to the role of human reason, both in the school, and in life generally. The age which is now opening contains grave challenges for our people. Only those whose rational powers have been sharpened will succeed. It is up to the schools to unlock these powers for most people. It is a job which will never be finally done; we will never do it well enough; but we need to bend our best efforts in this direction.

We need also to keep reminding ourselves that the roots of these rational powers, and of all education, are indelibly shaped in the very early years. Of all the levels of schooling, the most important is the elementary. Too often we turn to the secondary school or college when we seek improvement. The school we thus neglect is the one which alone has the capacity to make profound change in the human condition.—**End.**

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ETHICS

(Continued from page 34)

Newark and Hudson Terminal, New York.

The petition requires the consultant to arrive at the present value of the H&M Railroad, giving effect to the possibilities of interstate transit development, such as discontinuance of all Hudson River ferries, provision for a connection with the Jersey Central, other New Jersey railroads and the New York City transit system and its becoming part of a public enterprise.

Doe and Roe, located at ....., is a 65-year old firm. It has long been active in the fields of mass transportation and property valuations.

Architectural Firm Sets Up Govt. Dept., D. C. Office

Exhibit B

John Doe Associates, architects-engineers, has set up a Government department to be headquartered in the firm's own two-story building here. At the same time, a new office to service this department has been opened in Washington, D. C.

Richard Roe, associate of the firm, was named supervisor of the operation.

"We are investing 34 years of experience," Mr. Roe said, "in a massive program to spur development of quality building for budget-conscious government agencies."

John Doe Associates also has offices in New York City; Trenton, New Jersey, and Miami, Florida.

The firm is a complete architect-engineer organization with a staff of over 100, geared to handle large projects efficiently on tight time schedules. This is an extremely important aspect of government construction work, particularly for military work. Facilities available to the staff are designed for the most efficient flow of architectural production.

Since its organization, John Doe Associates, according to Mr. Roe, has planned, designed and supervised the construction of over 400 different projects including industrial and public buildings, schools, churches, hospitals, housing, recreational facilities and urban redevelopment. Many of these projects were accomplished on minimum budgets and tight time schedules.

A unique feature of the organization is the Materials and Methods Research Committee whose function is the investigation of new materials and methods of construction for possible inclusion in different projects. The Committee is geared to function as a clearing house through which all research is channeled. It also helps to eliminate duplication of effort, resulting in savings to contractors, builders and property owners.

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Note: Member Gillespie did not participate in the consideration or decision of this case.

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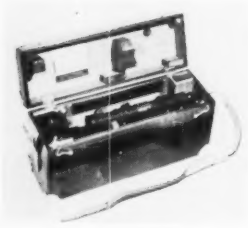

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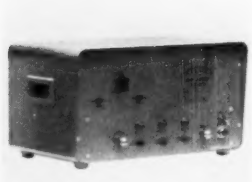

The Limpander Model SS-10 "Soft Sound" public address system, recently announced by Electronic Systems Engineering Company, emphasizes modern strides in sound reinforcement, resulting from high performance automatic audio power-control. Audio-acoustical problems heretofore "unsolvable" have succumbed to this new electronic amplifier. It makes sound reinforcement an engineering certainty by its ability to control reverberation and penetrate dead spots, says the manufacturer.

SANDBLASTER — Item 33

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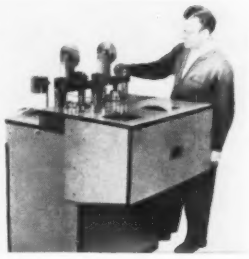
A product claimed to save engineers many man hours per year that they now spend searching for technical information has been announced by Technical Services Division of Rogers Publishing Company. Called "VSMF—The Microfilm Catalog File," the product, a catalog filing system on microfilm is a high-speed, easy-to-use facility which stores, retrieves and permits the rapid reviewing of technical literature. The unit consists of a microfilm file, reader and photo copy device.

VERSATILE VINYL — Item 35

A new vinyl plastic that is claimed to withstand temperatures sixty degrees higher than conventional vinyls—so that it can be used in household hot-water plumbing and even in industrial hot-acid piping—has been announced by B. F. Goodrich Chemical Company. The new material, a polyvinyl dichloride called hi-temp Geon, represents "the first significant breakthrough in this industry since the development of the first rigid vinyl twelve years ago," according to the manufacturer. The company states that the new material retains all the qualities of strength, light weight, impact resistance, nonflammability and corrosion resistance that have made vinyl the second-largest selling plastc in the world.

CONSOLIDATION APPARATUS — Item 36



A consolidation apparatus with automatic data recording has been announced by Soiltest, Inc. Using test data, the settlements of a building, bridge abutment or similar structure may be predicted and the design based on these factors. Called the British Autographic Consolidation Apparatus, the new instrument is reported to considerably reduce consolidation test time since readings are automatically recorded; the operator need not be continually present to record data.

TOUGH PLASTIC — Item 37

A plastic that won't flow when squeezed under a heavy load is giving new life to the common steel bolt which is used by industry to hold together everything from autos and bridges to farmers' silos. Bolts, work horses of the metal fabricating industry, are being capped with a durable and corrosive-resistant plastic to extend their usable life under high-rust or chemically-corrosive conditions. The capping method was developed by Clear-Cite Products. This resin-rubber plastic is designed to resist cold flow under loads.

This feature describes new products of general interest to professional engineers. For further information, circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

the pavement that stays completed...saves up to 60% on upkeep!

Already open for traffic, Interstate 83 from Baltimore, Maryland, to Harrisburg, Pennsylvania, soon will have *four* lanes of concrete all the way as the last miles are completed.

This is one Interstate System highway that won't be wearing detour signs! Only concrete has load-bearing strength that can be computed *mathematically* to match future traffic. Only concrete enables engineers to design highways to last 50 years and more!

There are no "moving parts" in concrete to cause hidden wear. And even under the highest temperatures concrete doesn't get soft. Traffic can't push its solid surface into ripples and washboards.

Concrete can't oxidize . . . there is never any adverse chemical reaction to sun, cold, air or moisture. So it doesn't dry out, lose strength and need expensive surface build-up treatments every few years. Then too, concrete actually grows stronger year by year.

All these engineering and material advantages of concrete add up to built-in thrift. Exceptional pavement life—and upkeep costs that will run as much as 60% lower than for asphalt. That's why you can look for more and more Interstate routes going concrete all the way!

Concrete saves 69% on upkeep during first 3 years on Oklahoma Test Road. Oklahoma laid connecting two-mile sections of concrete and asphalt, the best of each type. Exact records of all pavement upkeep costs show, three year total per mile: concrete, $229.98; asphalt, $745.11. So far concrete has actually saved $515.13 per mile!

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A national organization to improve and extend the uses of concrete

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